ENGINEERING NEWS-RECORD

A McGRAW-HILL PUBLICATION

SEPTEMBER 29, 1955

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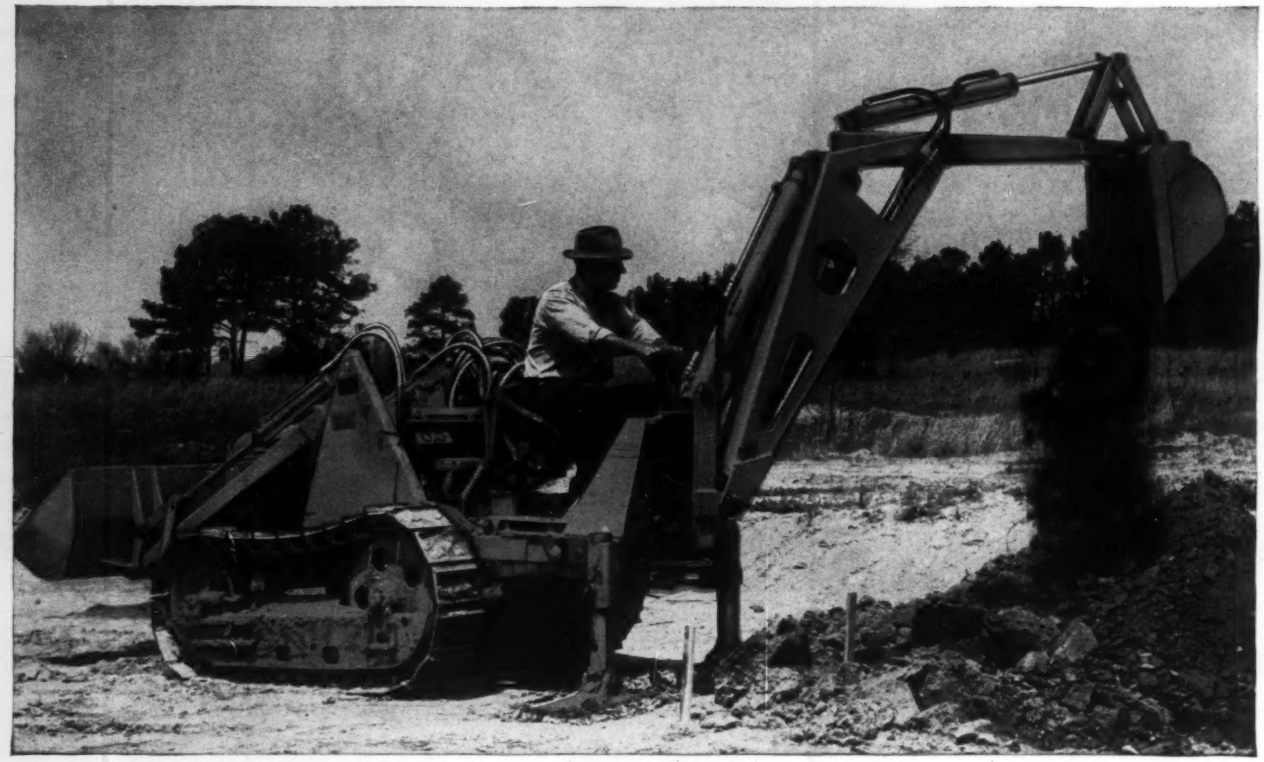
1955 CONSTRUCTION AND BUILDING COSTS

BEGINS ON PAGE 89



New Oliver Jet Trencher for OC-3 Loader hooks up or detaches in 90 seconds

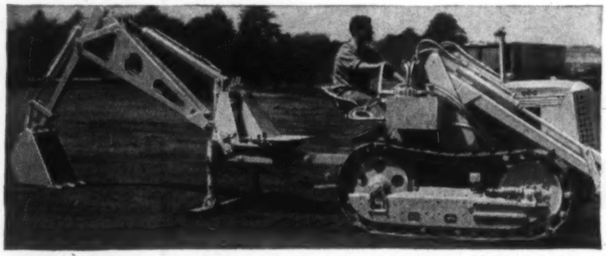
Exclusive 2-point hitch does the trick!

This new Jet Trencher is the perfect addition to the famous Oliver OC-3 Loader. It digs to 12 feet and lifts to 11½ feet—adds extra versatility without limiting tractor maneuverability or loader operation.

The exclusive hydraulic 2-point hitch makes hookup and removal a simple, one-man operation from the tractor seat. When the trencher is removed, the hitch holds the loader counterweight or quickly takes a number of handy attachments—scrapers, scarifiers, etc.

All new in design and construction, the Jet Trencher places all stress and strain on the trencher frame, not on the tractor, Its new mounting, offset to the side of the tractor, gives unmatched visibility and permits close parallel digging to walls, foundations. Full 180° boom swing gives straight side dumping.

Working from the loader hydraulic system, the Jet Trencher has powerful down pressure for digging through tough soil. Hydraulic control gives smooth, cushioned operations and insures long-life, low-upkeep operation. See this new trencher and OC-3 Loader. Ask your Oliver Industrial Distributor for a demonstration.



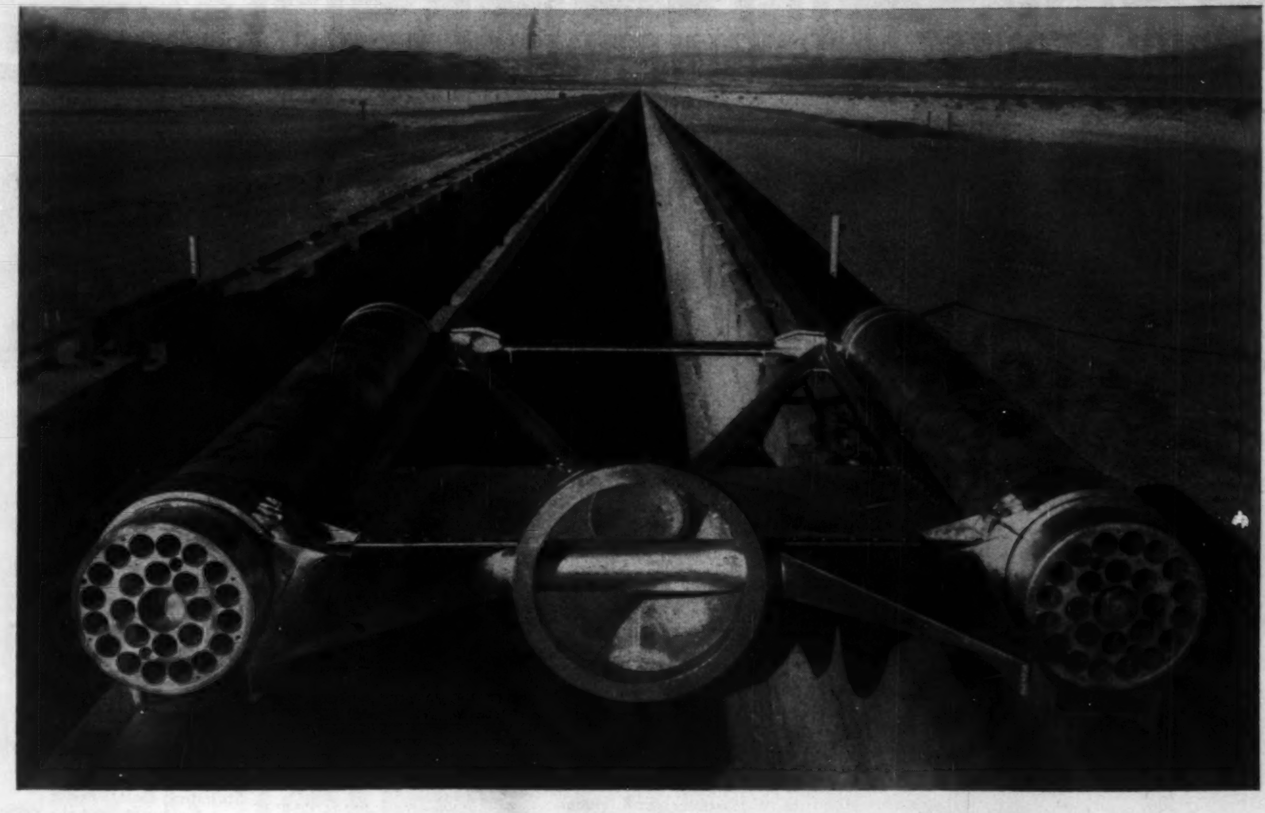
Hydraulic 2-point hitch is adjusted to fit slots on sides of trencher as tractor is backed into position. Snap-on fittings connect hydraulic lines—seat is swung around and trencher is ready to operate. When not attached, trencher rests, as shown here, on stabilizer blade and bucket.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

THE OLIVER CORPORATION

a complete line of industrial wheel and crawler tractors



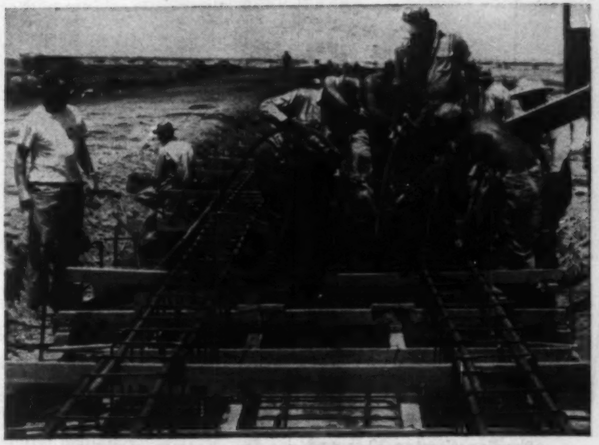
Traffic on this "railroad" moves at 2100 mph

At China Lake in the California desert is this Supersonic Naval Ordnance Research Track — Snort for short — used for captive-flight testing at supersonic speeds of guided missiles, rockets, projectiles and other devices related to national defense.

Snort is a remarkably aligned standard-gage track, 4.1 miles long. Test devices fly over the track on runners, rather than roll, at speeds as high as 2100 mph, roughly three times the speed of sound. At top speed more than a mile is needed to stop the jet-propelled carriage.

The heavy rails were laid to a horizontal tolerance of 0.06 in. and a vertical tolerance of 0.036 in. Rapid acceleration and deceleration develop tremendous up and down loads on the track. To take care of these stresses, the rails were imbedded in a heavy H-shaped reinforced-concrete continuous beam and fastened by specially developed anchors.

In building this concrete beam to its required strength more than 680 tons of reinforcing bars rolled by Bethlehem Pacific Coast Steel Corporation, Bethlehem's West Coast subsidiary, were used. Laid down in intricate patterns, the reinforcing bars, plus careful concreting, contribute both to the track's precision and its rigidity.



Pouring concrete for supporting beam of Snort. 680 tons of reinforcing bars, rolled by Bethlehem Pacific, Bethlehem's West Coast subsidiary, were laid in intricate pattern for full 4.1-mile length of track.

Bethlehem reinforcing bars, used on so many important concreting jobs from Coast to Coast, are made exclusively from new-billet steel, of known analysis. They come in size ranges from number 3 to 11, with deformations meeting ASTM Spec. A-305. They are cut to length and bent in our shops, and reach you bundled and tagged, with bar lists included, ready for instant placing.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM REINFORCING BARS

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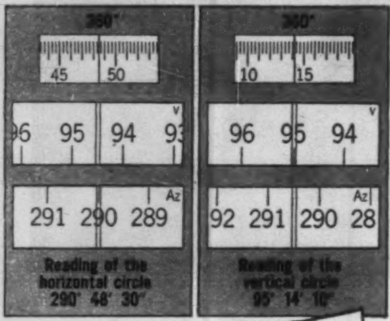
360°
45
50
96
95
94
93
V
291
290
289
Az
Reading of the horizontal circle 290° 48' 30"
360°
10
15
96
95
94
V
92
291
290
28
Az
Reading of the vertical circle 95° 14' 10"

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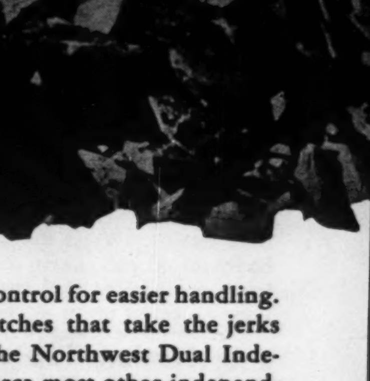
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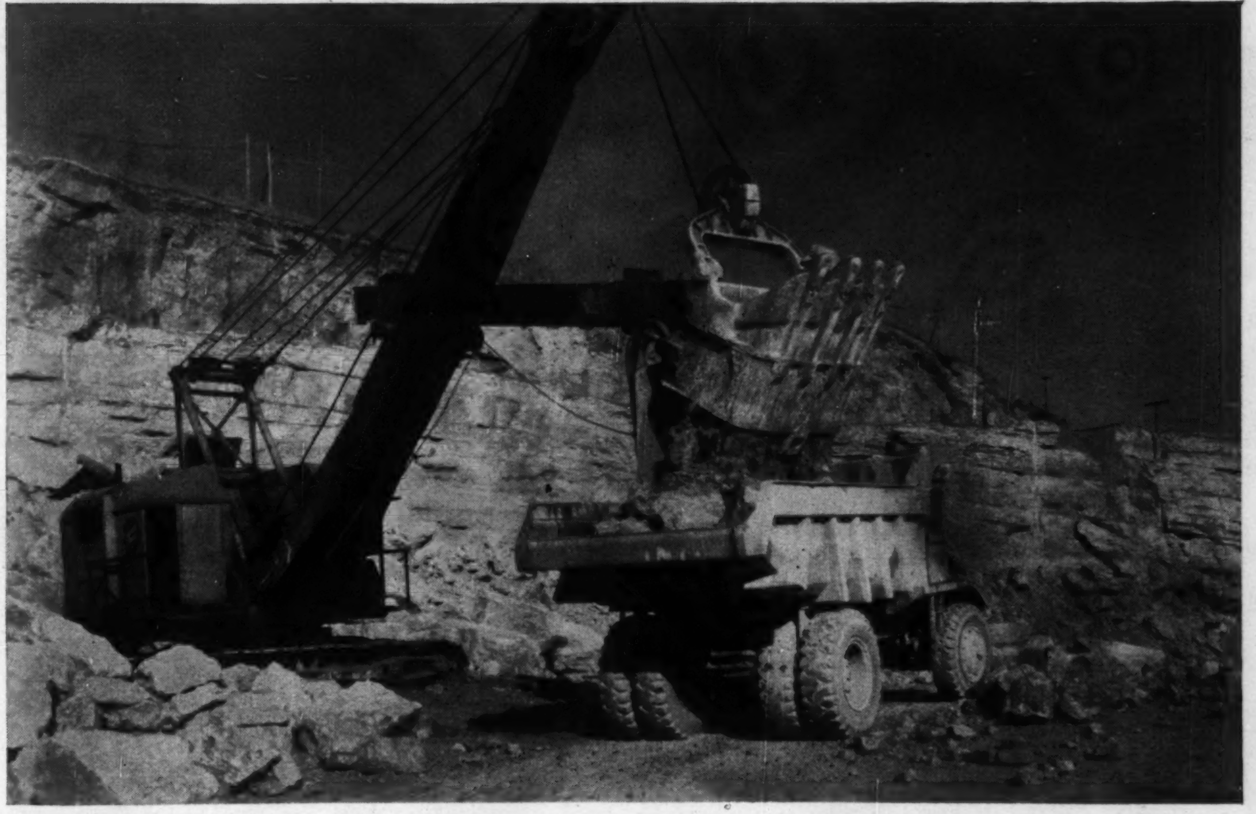

All-Nylon tires roll 5,000 hours on original tread, user reports

SUPPLYING a host of materials to the construction industry—from concrete and brick to crushed stone and gravel—is the job of the Consumers Co., of McCook, Ill. Trucks without springs carry 15 tons of rock over the unsurfaced road from diggings to crusher. This means the tires must take all the shock.

B. F. Goodrich *all-nylon* tires do the job, Consumers Co. reports. They give up to 5,000 hours of service, and are 50% less susceptible to tire-killing, production-stopping blowouts.

How nylon saves you money

Nylon is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. That's why the B. F. Goodrich *all-nylon* tire body outwears even its extra-thick tread, can be recapped over and over! You get more original hours of service, more hours of service per recap.

Your B. F. Goodrich retailer has a complete line of *all-nylon* off-the-road tires. Find out from him how you can save money, no matter what kind of work you do. His address is listed under Tires in the Yellow Pages of your telephone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

ALL-NYLON Rock Logger and Universal tires under 15-ton load on the way to the rock crusher.

CONSUMERS trucks travel up steep ¾-mile road from diggings. *All-nylon* tires resist bruising and sidewall scuffing.

Specify B. F. Goodrich tires when ordering new equipment

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B.F.Goodrich
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> **"Considering the tough jobs we do where our equipment is exposed to dirt and bad weather, Texaco gives our engines outstanding protection. Our engines run clean, bearing wear is at a minimum and down time is negligible. Our maintenance costs are low, too."**

Isbell relies on the famous *Texaco Ursa Oil* series — a complete line of lubricating oils especially refined to make diesel and heavy duty gasoline engines give *more power* with *less fuel* over *longer periods* between overhauls. Whatever the size, type and speed of *your* engines, or fuel used, there is a member of this famous series exactly right to assure these benefits.

For chassis lubrication, Isbell uses *Texaco Marfak* — it assures longer lasting protection against wear and rust. It won't squeeze or jar out of bearings, seals out dirt and moisture.

For wheel bearings, Isbell uses *Texaco Marfak Heavy Duty* — it protects against dirt and moisture, seals itself in, assures safer braking. No seasonal change required.

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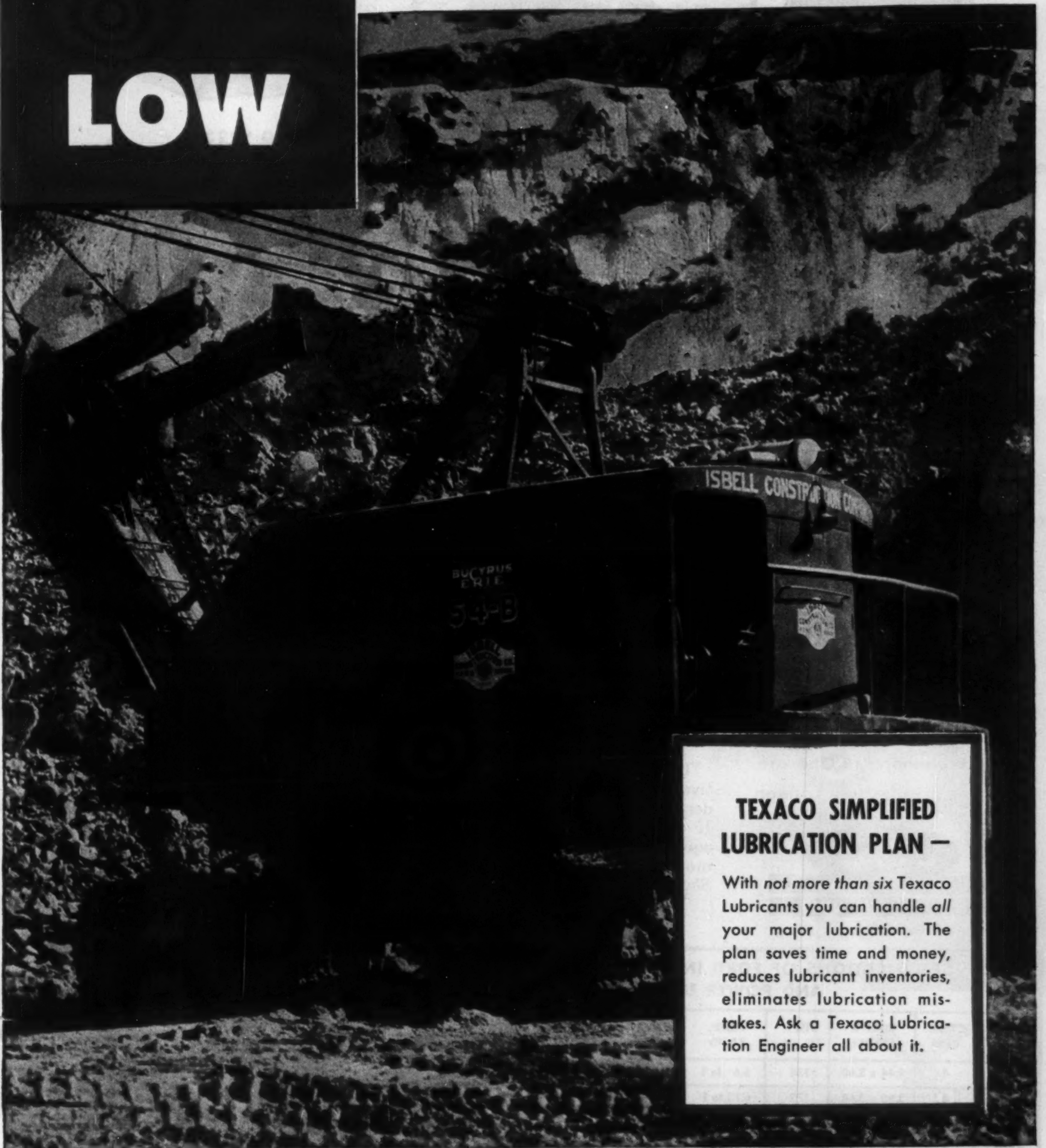
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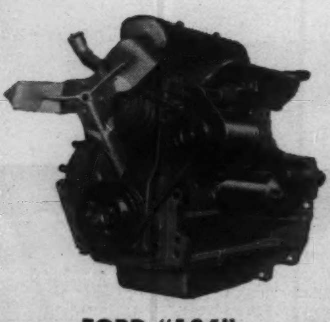

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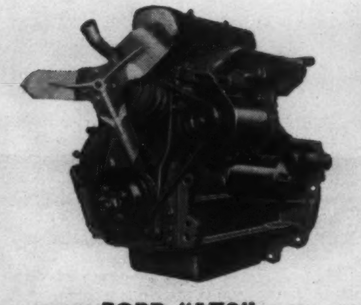

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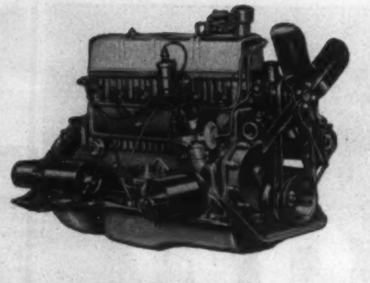

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172	4	3.90 x 3.60	172	6.75 to 1	61 @ 2800	148 lbs.-ft. @ 1400 rpm
223	6	3.62 x 3.60	223	7.8 to 1	107 @ 2800	202 lbs.-ft. @ 2000 rpm
272	8	3.62 x 3.30	272	7.6 to 1	131 @ 2800	249 lbs.-ft. @ 2400 rpm
332	8	3.80 x 3.66	332	7.5 to 1	160 @ 2800	308 lbs.-ft. @ 2300 rpm

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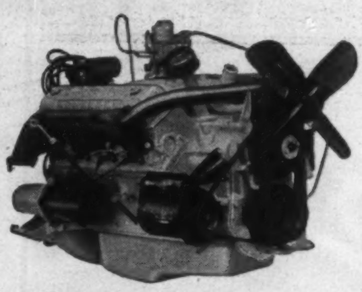

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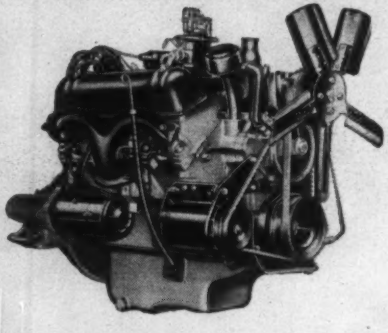

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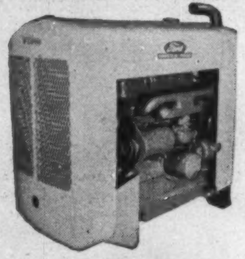

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Amvit Jointed Clay Pipe is just one of the many products manufactured in our plants across the nation. American Vitrified Products Company also produces concrete pipe, clay pipe, flue liners—both glazed and unglazed, and clay liner plates.

For more information, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

The Amvit joint is made of a new acid resistant plastic material with rubber characteristics. Like the pipe, the joints will not be harmed by any condition of underground service. The pipe is simply pushed together. The trench is then ready for backfilling.

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FOR
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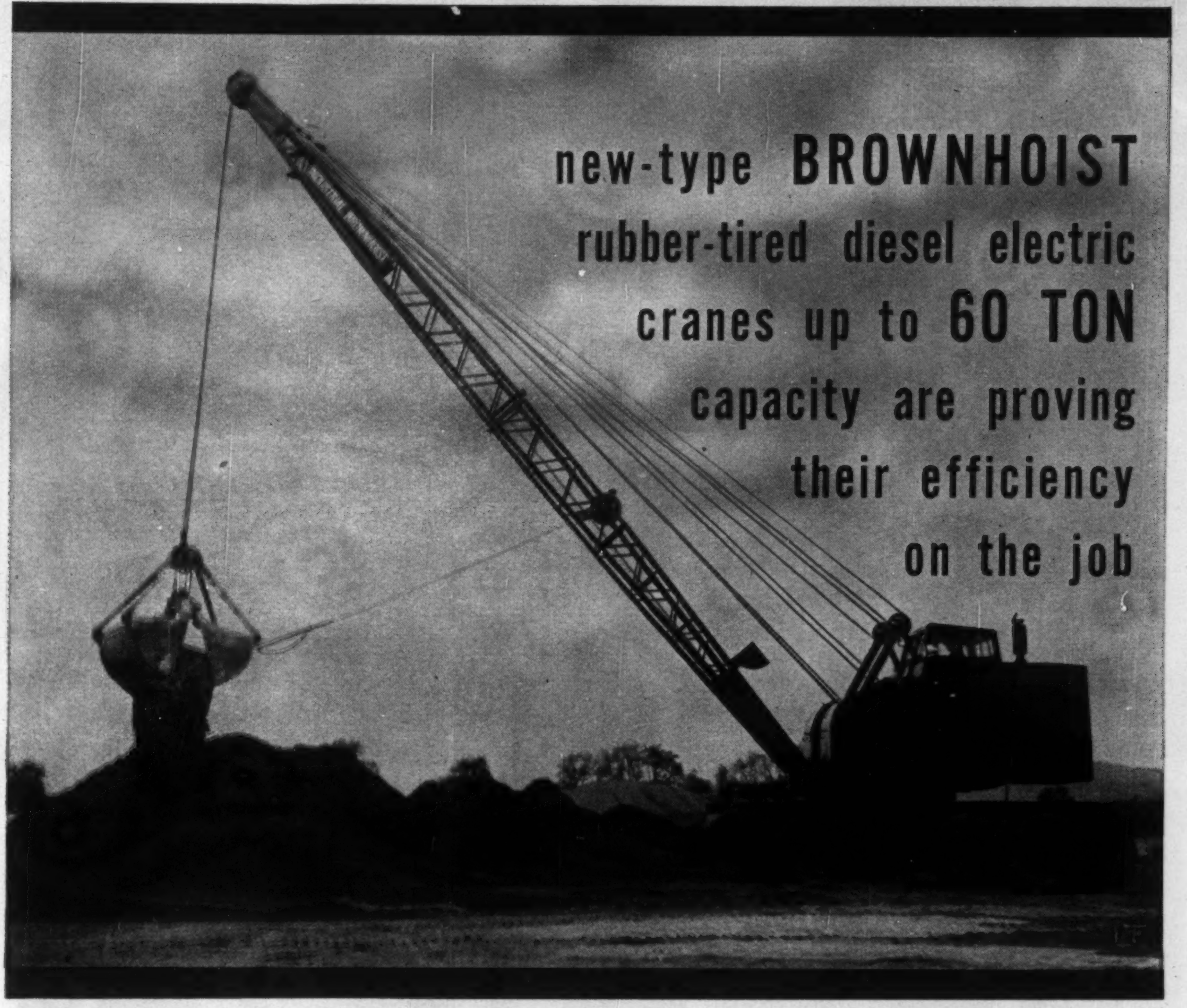
BRIXMENT

To build the best possible concrete-block walls, the bricklayer must use plastic mortar. The mortar must be plastic enough to stick to the long head joint. It must not drop off the edges of the block when the block is swung up, and lowered into place. It must remain plastic long enough to enable the bricklayer to tap the block down to the line, easily and accurately.

Brixment mortar provides this necessary plasticity. Moreover, it stays soft and plastic long enough to let the bricklayer level, plumb and straighten the unit and adjust it to its final position in the wall before the mortar stiffens.

Louisville Cement Company . . . Louisville 2, Kentucky


new-type BROWNHOIST
rubber-tired diesel electric
cranes up to 60 TON
capacity are proving
their efficiency
on the job

183

BROWNHOIST MATERIAL
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GIVES A LIFT TO
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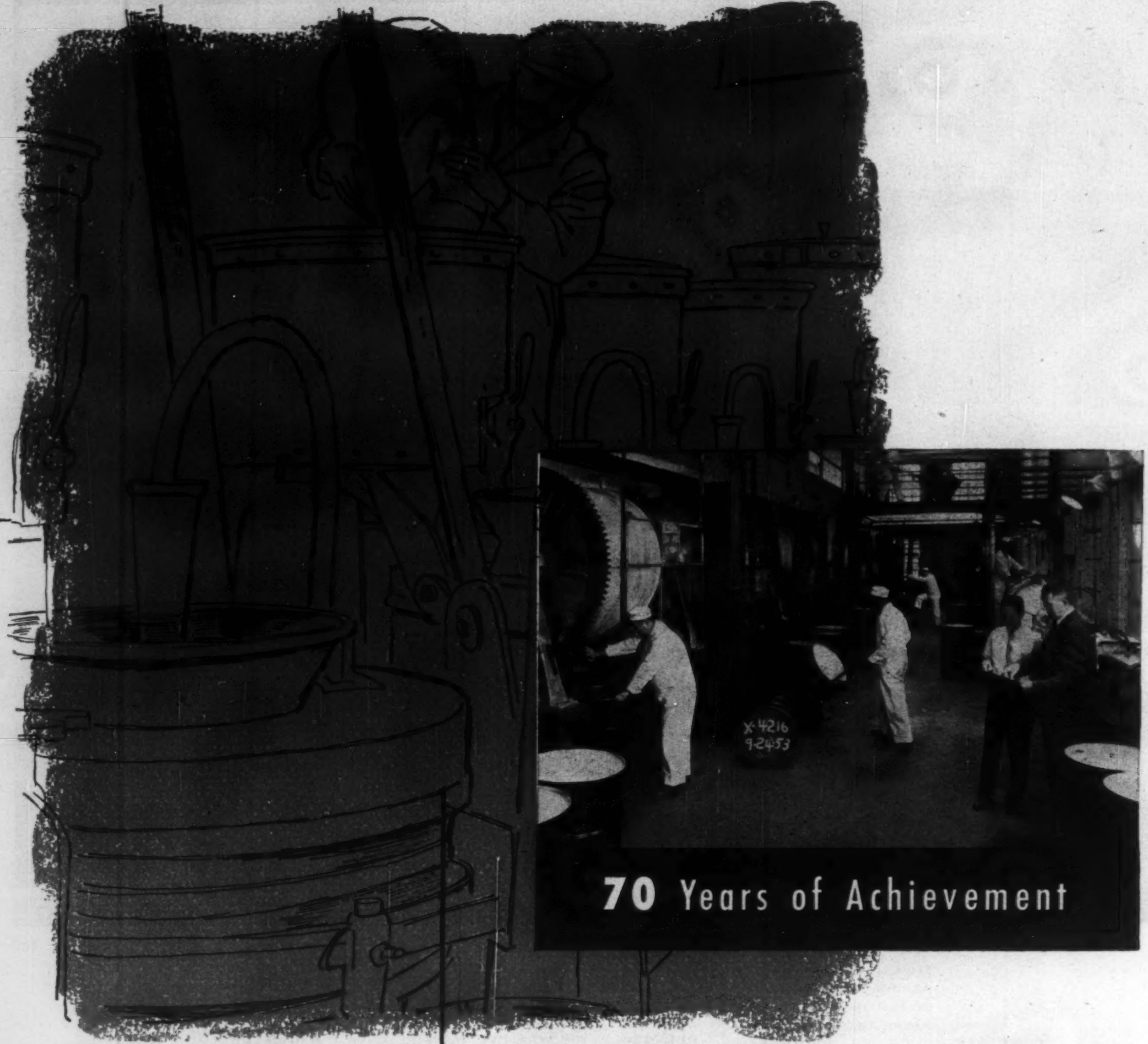

Progress in paint production runs parallel with the increasing demand of manufacturers for more prompt delivery of orders. Through the years TOUSEY has met this challenge with constant changes in its organization. New equipment is added whenever necessary, obsolete machines discarded. The elimination of the old stone mill in favor of the steel ball mill was probably one of the most significant of these "turn-overs." This policy of keeping abreast of the times, regardless of cost, is one of the many reasons TOUSEY finishes are the finest.

Let us help you with your finishing problems—write today.

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READER COMMENT

Balanced Flood Control

Sɪʀ—Congratulations on your editorial "Can Flood Control Cope with Flash Floods?" in the September 1 issue. Such sane reasoning is needed to counteract the claims of doubtful veracity by advocates of both down-stream and up-stream flood control projects that if only their pet projects had been built the damage would have been greatly lessened.

You have correctly pointed out that the greatest protection from flood damage would come from increasing the channel capacity of the streams and by zoning to prevent building in areas known to be subject to dangerous flooding. Yet this will not be as popular as flood-storage reservoirs, large and small. Will the public be willing to pay the price of relocation of property values and sharing the costs with the federal government?

A storm such as the recent one could hit any section of the country. What is needed is a realignment of our national flood control policy with a better balance between storage structures, channel clearance, and flood-plain zoning; and a more equitable sharing of the costs between federal, state and local governments.

Rɪᴄʜᴀʀᴅ W. Sᴍɪᴛʜ, *Manager*
Natural Resources Department
Chamber of Commerce of
the United States
Washington, D. C.

Standards for Soil Testing

Sɪʀ: Please permit me to comment briefly on your editorial in the July 14 issue, p. 120, concerning Professor Burmister's views on soil testing.

Deep foundation soils are the most variable and heterogeneous materials in the universe and in developing standards for testing; we, of Committee D-18 of the ASTM, thoroughly realize that we are not dealing with acceptance tests which apply to paints, metal alloys, concrete, etc.

Note that I choose the expression, "standards for testing," rather than "standard tests." There is a distinction, recognized by all, I believe, who have struggled with deep foundation soil problems. We recognize that there are basic principles of certain general features of soil testing that have general application in all techniques and procedures observed in soil laboratories; but beyond this, we are well aware of the fact that the procedures themselves must be flexible to the extent that they may be adapted to a wide range of soil *conditions* and types of structures.

The term, "soil conditions," is used advisedly and in contradistinction to the term, "soil properties." Such physical properties as grain size distribution and specific gravity are not altered by construction procedures or even by testing, but such structural properties as resistance to shear, rate and magnitude of consolidation, etc., change with the conditions imposed on the soil mass by construction *procedures*. In Navy water-front construction, we know that we can preserve or destroy desirable structural properties of soils according to choice of construction operations and the sequence of operations. Books can be written on this subject. For example, there are many different means for unwatering the site of such a particular graving dock, several wrong ways, and one or more ways that are right. The right way assures preservation and utilization of the in situ structural properties of the foundation soils to a maximum extent.

All soil testing for deep foundation work must be planned with two major objectives in mind: first, to obtain adequate and economical design; and second (and of equal importance), to work out or develop the construction procedures that can guarantee a minimum of foundation instability.

It is repeated that soil tests must be *planned* with these two objectives in mind. How then can there be a cut and tried routine procedure that has equal application to all manner of types of structures and to extremely varied soil conditions? One of the most fatal of all errors is to send soil samples from a site to a testing laboratory that has no knowledge of the site, of the terrain, of changing ground water conditions, of the type of structure to be built at the site, and of the complex problem of interaction of the soil and the structure, and ask that laboratory to make the "usual" standard tests of the soil samples, thereafter, turning the data over to some irresponsible optimist for "use."

The planning of the soil tests and the foundation engineering involved are inseparable. The standards for testing must be pliant and flexible to the extent that they provide means for solving the perplexing problems encountered in each individual case. It is true that there is a striking similarity in the problems encountered in many different cases; but there are also dissimilarities and, to this extent, soil

(*Continued on page 22*)

Flexible Plant Serves Two States

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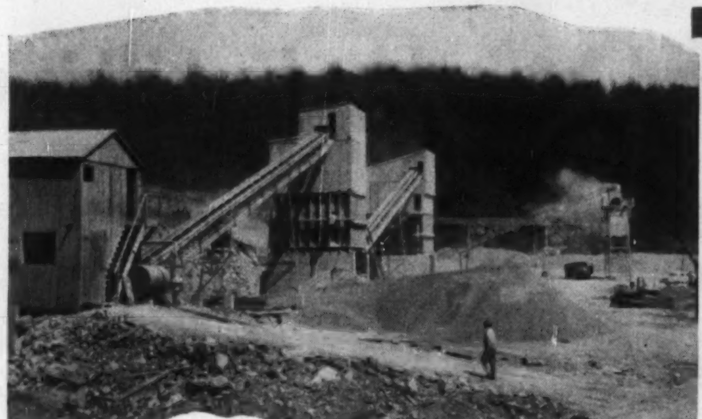
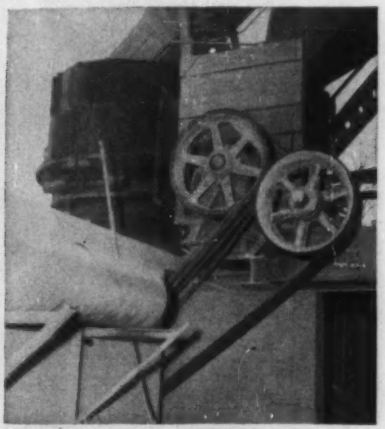


General view of plant with primary crusher house at extreme left.

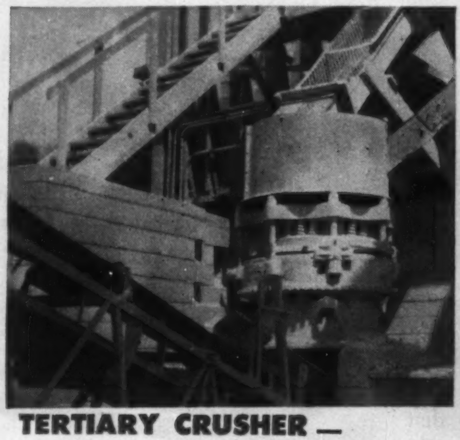
D. M. Stoltzfus & Son, Inc., of Talmadge, Penn., own and operate three quarries. This is their Cedar Hills plant, at Peach Bottom, Penn., near the Maryland line. Designed and equipped by Telsmith engineers—this remarkably flexible plant produces sizes 1, 2, 6, 7, 8, 10 and 467 to meet Maryland specifications; and sizes 4, 3A, 2A, 2B, 2, 1B and 1 to meet Pennsylvania specifications. The plant easily turns out about 250 tons per hour. Find out about Telsmith Complete Plant Service. Ask for Bulletin 278.

Q-31

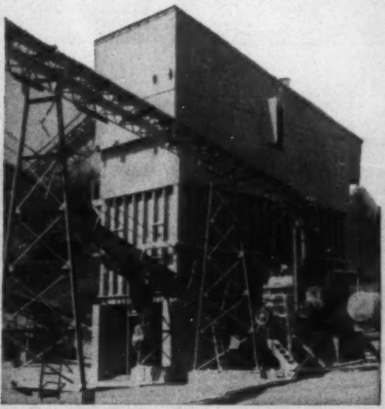
PRIMARY CRUSHER—30″x42″ Telsmith Jaw Crusher, served by a 42″x14′ Telsmith Heavy-Duty Apron Feeder.



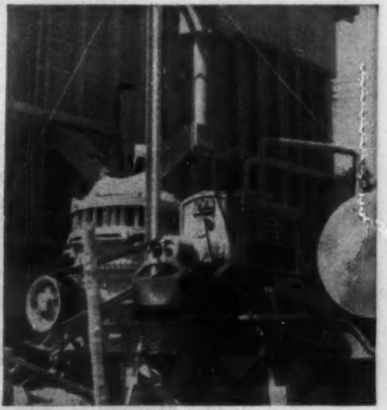
SCALPING SCREEN and SECONDARY CRUSHERS—(Left) Telsmith 13B Gyratory Breaker, and (right) Telsmith 10″x36″ Jaw Crusher preceded by a Telsmith 5′x12′ Double Deck Heavy-Duty Scalper.



TERTIARY CRUSHER—A Telsmith 36 Standard Gyrasphere.



INTERMEDIATE SCREENS—Telsmith 4′x12′, 5′x12′ Vibro-Kings.



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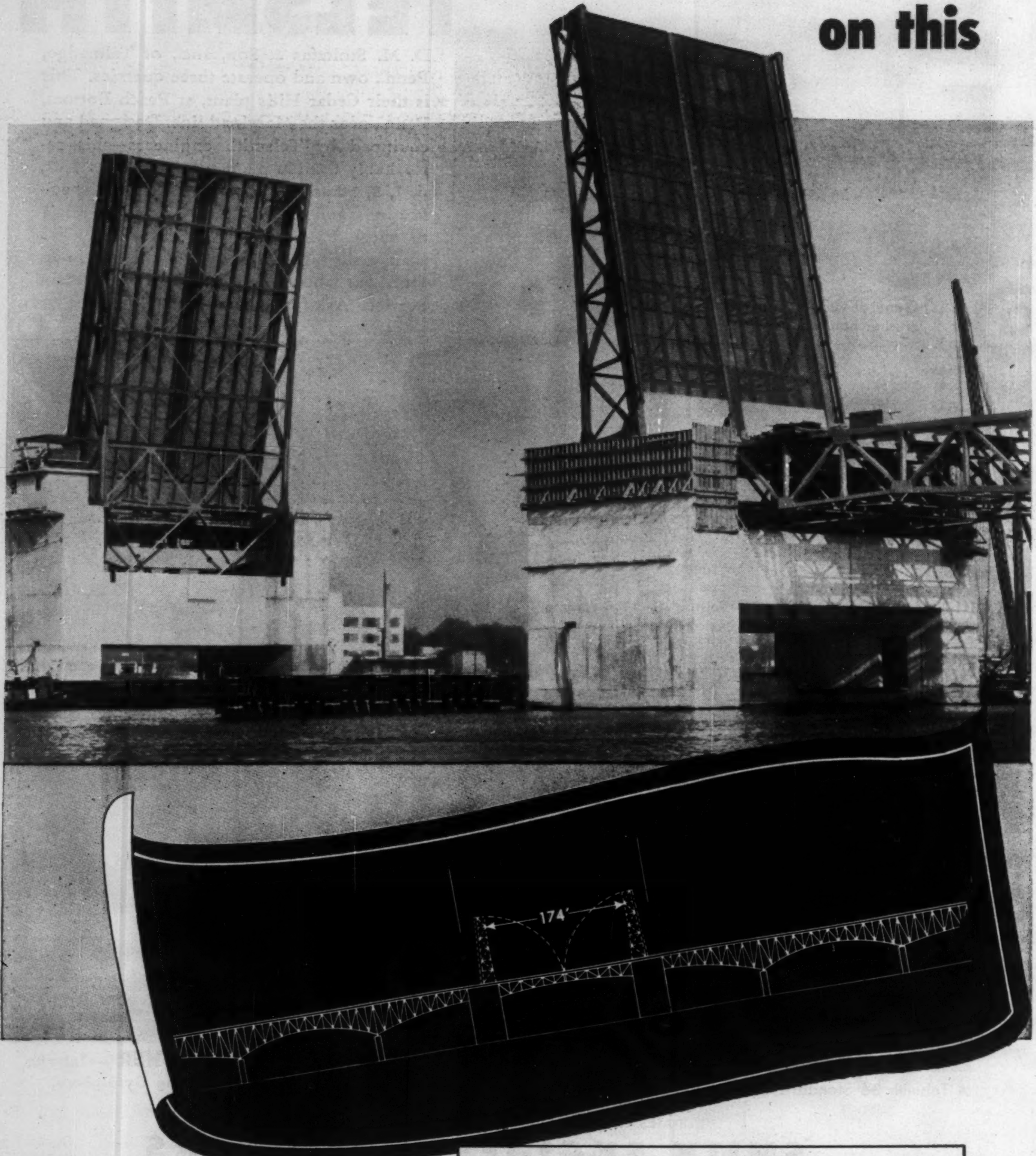

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663,936 lbs. flooring deadweight

long, wide double-leaf bascule span

■ The 193′6″ double-leaf bascule span on the four-lane Gilmore Street Bridge across the St. Johns River, at Jacksonville, Florida, provides another good example of the advantages of I-Beam-Lok lightweight steel flooring for structures of this type.

The total amount of USS I-Beam-Lok laid on the 55′11″ roadway of the two bascule leaves is 10,677 sq. ft. of which 9,535 sq. ft. is the 5-inch open type flooring. The remaining 1,142 sq. ft. is the 3-inch concrete-filled type used in the part of the bascule leaves over the machinery.

If conventional 7″ concrete slab flooring (weighing 84 lbs. psf. as against 18.8 lbs. psf. for 5″ open I-Beam-Lok and 47 lbs. psf. for 3″ concrete filled I-Beam-Lok) had been used on this project, the floor of the long, wide double-leaf span would have had a deadweight of 896,868 pounds. *Four times greater than its present light 232,932 lbs. deadweight!* In addition, the heavier flooring would have increased the wind resistance of the span, and made necessary the installation of costlier, more powerful mechanical equipment to raise and lower the heavier bascule leaves of the span.

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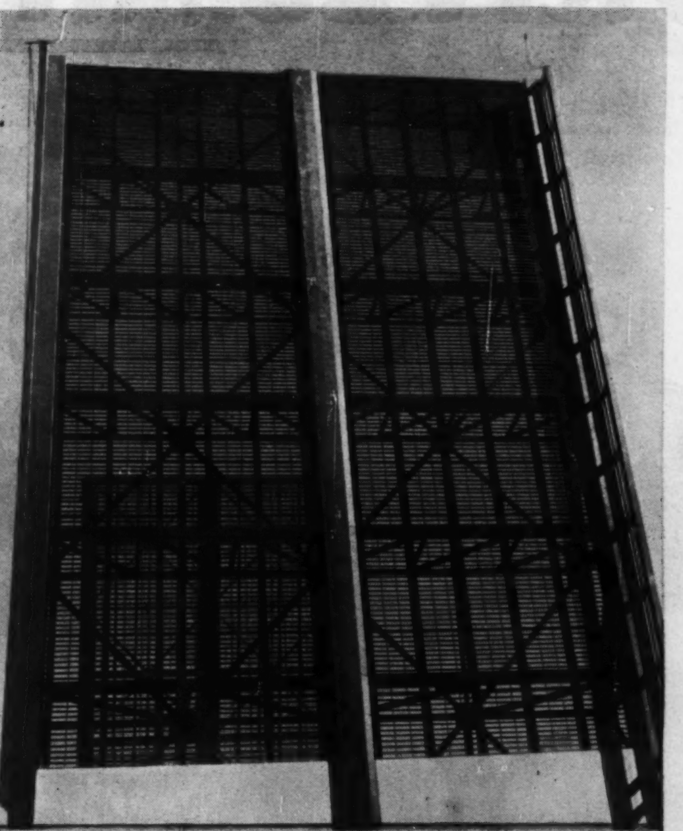

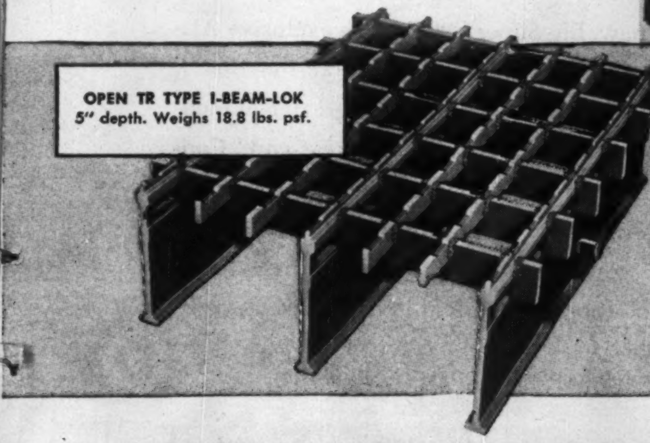

OPEN TR TYPE I-BEAM-LOK
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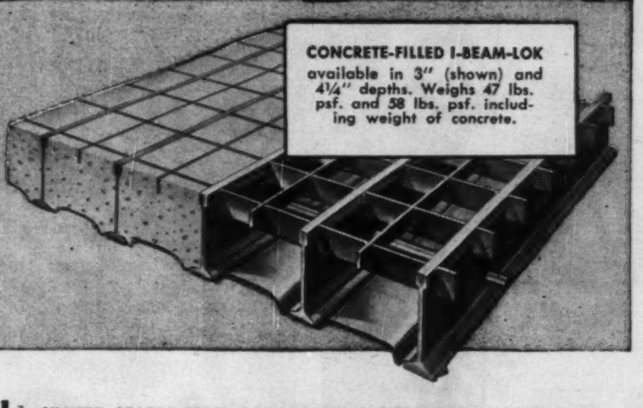

CONCRETE-FILLED I-BEAM-LOK
available in 3″ (shown) and 4¼″ depths. Weighs 47 lbs. psf. and 58 lbs. psf. including weight of concrete.

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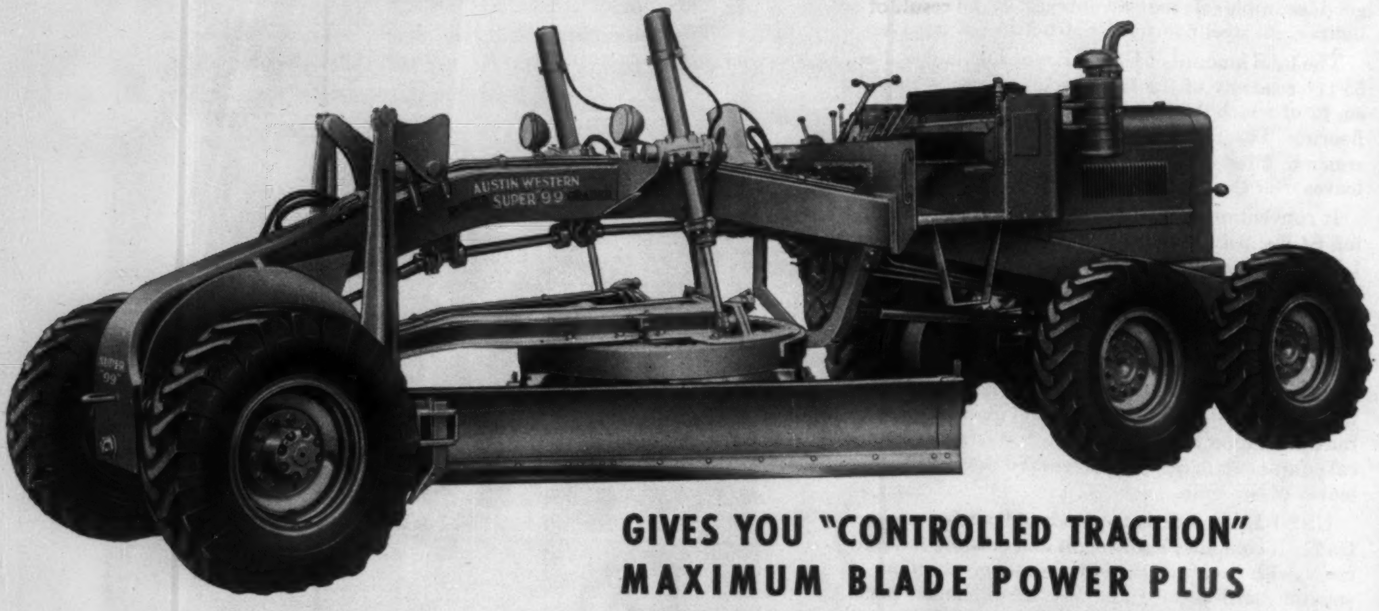

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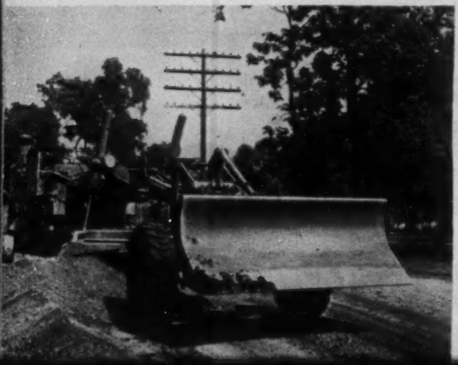

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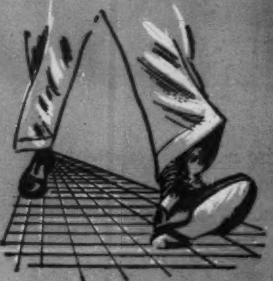

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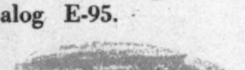

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ENGINEERS: Whitman, Requardt & Associates, Baltimore, Maryland, for Washington Suburban Sanitary Commission, Hyattsville, Maryland.

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PIPE: Manufactured by United States Concrete Pipe Company — 72" Reinforced Concrete Culvert Pipe in 8' lengths.

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ENR-5511

READER COMMENT

testing procedures used in the different cases must be correspondingly dissimilar, modified and adapted for each separate project.

It is extremely difficult to put into words the experience of many years that warns us against the use of misinformation provided by inflexible, routine standard soil testing procedures. The more varied is one's experience, the more he appreciates this fact. In a few phases of soil engineering such as the compaction of subgrades prior to the paving, it is possible to have standard tests that tend to be inflexible. There is some possibility for having such standards in dealing with surface soils; but those whose experience is confined to this rather narrow field require a better appreciation of the difficulties encountered in foundation problems if they consider that standard tests can be described which require no modification in dealing with the problems of the other fellow.

L. A. Palmer
Engineering Consultant
Soil Mechanics & Paving
Bureau of Yards and Docks
Department of Navy

Psf not Psi

Sir—Although we maintain due respect for hurricane winds in this area, our present building code wind loadings are based on only 45 pounds per square foot instead of the 45 pounds per square inch referred to in your editorial, "Can Hurricane Damage Be Cut" (ENR Aug. 25, 1955, p. 96).

Seriously, though, your editorial has been read with appreciation by engineers in this area; additional studies of hurricane damage and what engineers can do to reduce damage will be welcomed in Miami.

Herbert S. Saffir
Assistant County Engineer,
Dade County, Miami, Fla.

[Editor's Note—Sincere apologies for a typographical error (psi for psf) thrice repeated.]

Timber in Schools

Sir—Your report on Schools in the May 26 issue gave an excellent picture of the problem confronting our country and of some of the steps being taken to alleviate the situation. One important phase of the subject, however, did not in my opinion receive sufficient recognition:—that is, the strong assist given to economical school construction by the use of en-

(*Continued on page 30*)

Check 'Em!

ONLY ADAMS Motor Graders have all these time and money-saving advantages

8 Forward Speeds
✓ Provide the "right" speed for every operation and a higher travel speed. Save time—reduce costs.

4 Reverse Speeds
✓ Up to 13 mph. . . . Save valuable production time backing on short stretches, between forms, etc.

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✓ ¼ to 1¾ mph. (optional). Use full engine power while gearing grader to slow-speed operation.

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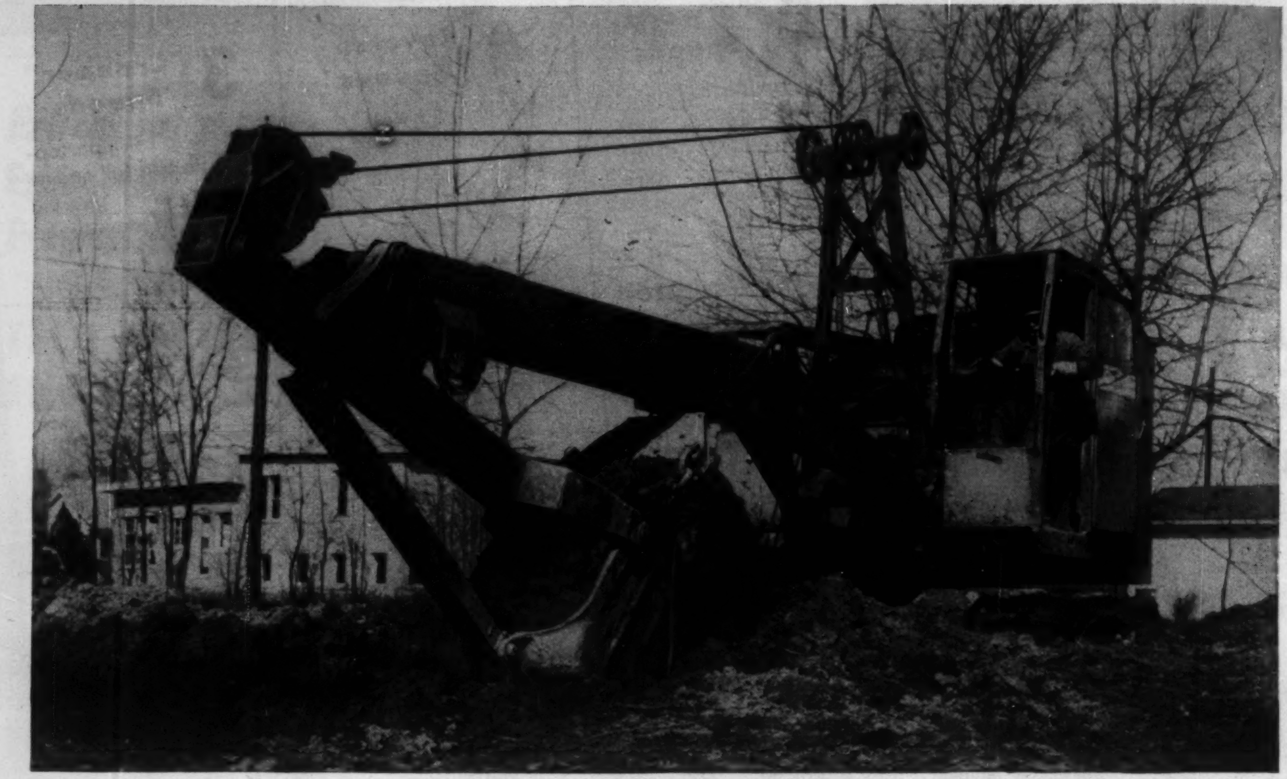

Amsco backhoe bucket at work

Digging! Crushing! Handling! Amsco manganese steel parts work up to 10 times longer under punishment . . . because manganese steel can easily absorb heavy impact and abrasion. Hard work toughens the metal . . . it work hardens to as high as 550 Brinell. The pounding, grating action of rock and ore only polishes manganese steel.

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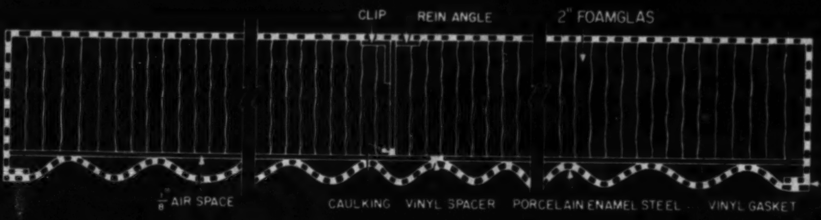


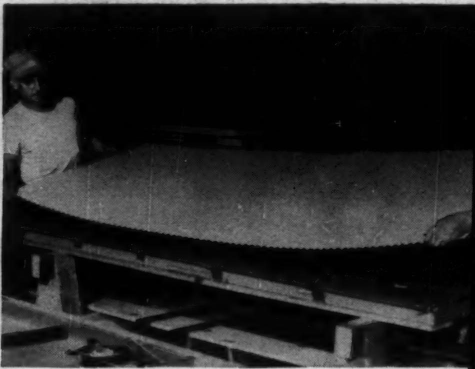
Architect: Vincent G. Kling, A. I. A., Philadelphia, Pa. • *Consultant:* I. M. Pei, New York, N. Y. *General Contractor:* Turner Construction Co., New York, N. Y. • *Panel Manufacturer:* Ingram-Richardson Mfg. Co., Beaver Falls, Pa. • *Roofer:* Wm. C. Kulzer Co., Philadelphia, Pa.

The architect, members of his staff and RCA's representative check progress at the job site during erection of the five Cherry Hill buildings. The owner and the architect report: "We overcame design problems plaguing grid-panel pioneers by insulating the porcelain enamel panels with 2" FOAMGLAS.

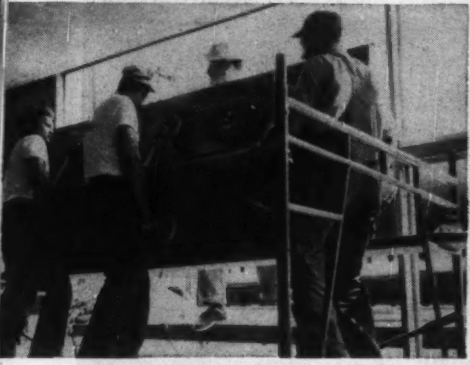
Unique porcelain enamel-cellular glass sandwich developed for RCA's Cherry Hill curtain walls

"We avoided any moisture problem by providing a 1/8" air space between the insulation and the outer porcelain enamel skin (detail above).

"Moisture can accumulate only in the air space and runs down moisture-proof FOAMGLAS to a weep strip. Caulking seals joints.



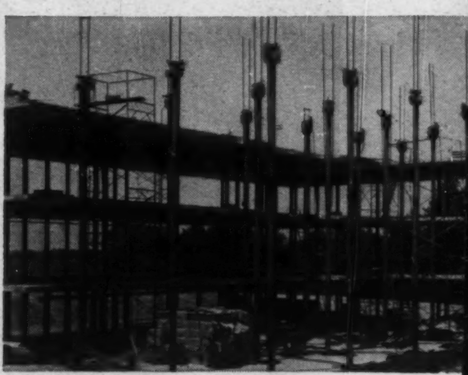
"High rigidity of FOAMGLAS and vertical corrugations of outer skin prevent 'oil-canning' or dimpling.



"Completed 94" x 34" PORCELPANELS* weighing just 6½ lbs. per sq. ft. were easily lifted into place.

* ® Ingram-Richardson Mfg. Co.

"Our unique panels combine ultra-modern appearance and high insulating efficiency (U factor 0.15) . . . cost just $4.50 per sq. ft. erected in place.



"Lift slab method cut construction time and costs. Roofing materials were raised right on the top slab.

"We also insulated most roofs with FOAMGLAS. Its high strength permits heavy foot traffic, minimizing need for catwalks.

"FOAMGLAS gives our Cherry Hill buildings added protection, too, because it's fireproof."

Use coupon today for a copy of our brand new booklet on latest curtain wall designs which utilize . . .

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the cellular, stay-dry insulation

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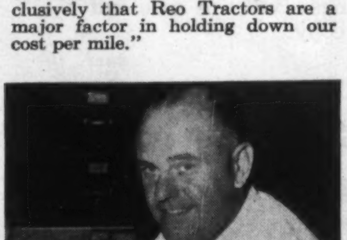
here's what they say:

Left to right: Gene Schwartz, Oscar Wohlhueter, August Deuchlar, owners of Concrete Delivery Co., Inc., Lackawanna, New York. Oscar Wohlhueter, President, states—"These Reo Model A-603s powered by your V-8 220 H.P. engine are the finest we have ever owned . . . remarkable performance and economy. Our drivers report the V-8 goes up grades in 1 to 1½ higher gears than any they have driven."

E. F. Carlson, President, Carlson Truck Service, Inc., Buffalo, says—"Ours is one of the toughest kinds of trucking there is, stop and go, short hauls with heavy loads up to 40,000 pounds.

We have been using Reos since 1952 and our first units have acquired over 100,000 miles without a major overhaul. Our records show conclusively that Reo Tractors are a major factor in holding down our cost per mile."



Robert C. Schutt, President, John Schutt, Jr., Inc., Buffalo, reports—"We are very pleased with the performance of our Model A703 Reo powered by your 220 H.P. V-8. Average fuel mileage is 5.25 M.P.G.

Anthony Palmer is one of our drivers. He says he is amazed at the driver comfort, the maneuverability and the power-plus that this Reo has."

and your next truck will be REO, too!

REO has the most complete advanced line of heavy- and medium-duty truck engines available today—*with both short stroke design and revolutionary wet-sleeve construction.* Choice of V-8s or sixes, gas or LPG. Pound for pound Reo Gold Comet V-8s are the *most powerful heavy-duty truck engines ever built,* actually delivering a startling ½ h.p. per cu. in. displacement—as much as 35% *above the industry average.*

REO features the conventional type "full comfort" cab in its entire V-8 line. Only 96" (front-of-bumper-to-back-of-cab), it permits hauling of 35' square nose trailer within 45' overall.

REO designs its own engines and backs every one it builds with a *100,000 Mile or 1 Year Warranty,* whether in new Reo Trucks or for replacement in other makes. No other manufacturer gives you such positive assurance of outstanding performance.

REO knocks out high overhaul costs and downtime loss with built-in engine features, like wet-sleeve construction, that permit complete overhaul in as few as *15 hours.* Complete overhaul kits cost as little as *$169.47* (list).

REO builds trucks that are "commodity engineered" *at the factory* to meet your specific needs, thereby assuring you of lowest possible cost of operation . . . *trucks built for truckers by truck specialists.*

LOOK AT REO! Ride in one—drive one—an amazing "new concept" in live-wire, big truck performance awaits your discovery. Look under "R" in your telephone book and call your Reo branch or distributor today.

WATCH REO ROLL

REO MOTORS, INC.
Lansing 20, Mich. • Toronto, Ontario
SUBSIDIARY OF BOHN ALUMINUM AND BRASS CORPORATION

TRUCKS, BUSES AND GOLD COMET ENGINES FOR ORIGINAL EQUIPMENT, INDUSTRIAL AND REPLACEMENT—GAS OR LPG.

REO
WORLD'S TOUGHEST TRUCK

Uranium Strike!

Back in the hills of the Colorado Plateau, the dependability and low-cost operation of Le Roi Compressors pay off

Uranium is a magic name. And to anyone interested in low-cost, dependable, air compressor operation, the name of Le Roi is magic, too. Just take a look at a few features that keep Le Roi Compressors running after others have "called it quits":

- Suction and discharge valves are interchangeable.
- Cylinders have circumferential fins for better cooling — greater efficiency.
- Radiators and intercoolers have sectional cores.
- Larger air receiver reduces pulsation and cools the air so that tools run better.
- Larger engines for greater reserve power permit slower operating speeds, longer life.

Le Roi Compressors are available in sizes from 85 cfm to 600 cfm. Gas or diesel models and a complete selection of mountings. Bulletins give full details — write for your copy.

C-157

LE ROI *Division of Westinghouse Air Brake Co.*
Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS TRACTAIR STATIONARY AIR COMPRESSORS AIR TOOLS ENGINES

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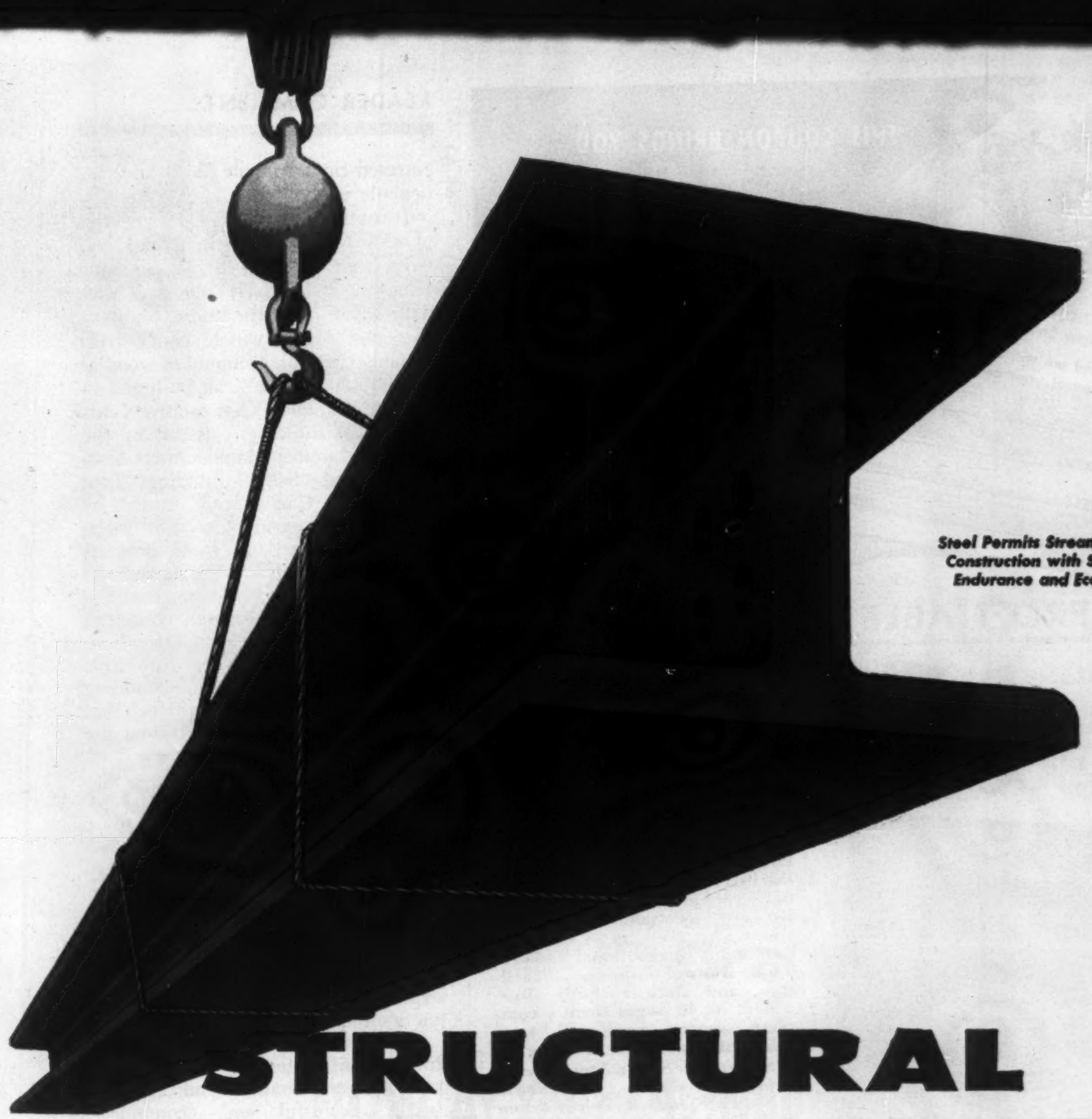

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STEEL for bridges and all types of buildings

No other construction offers these time-proved advantages:

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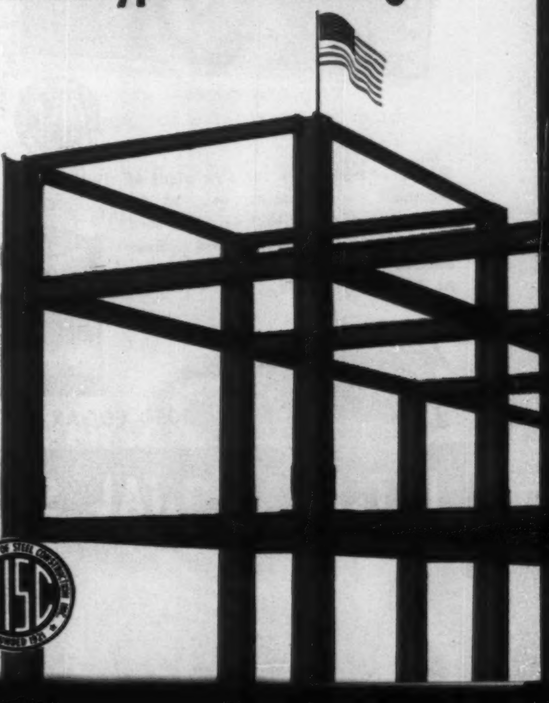

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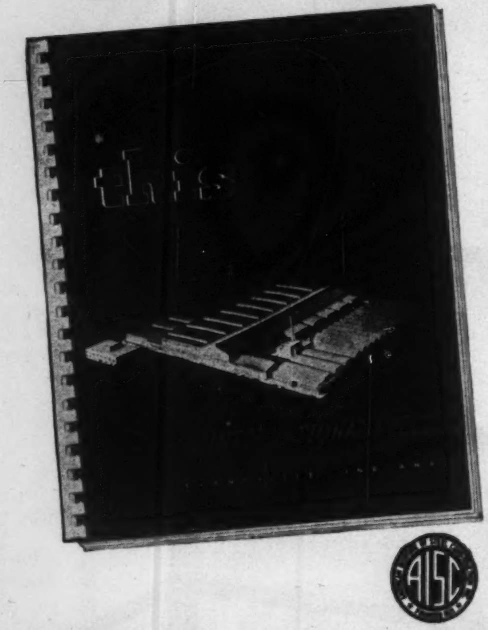
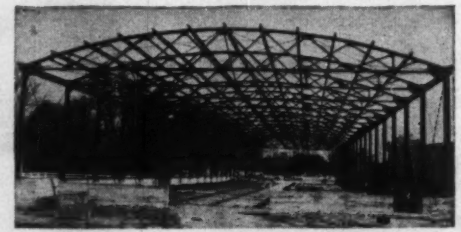
HERE is a book that belongs in the reference file of *every buyer* of *every kind* of fabricated steel. Between its handsome covers, you'll find a wealth of information about International Steel — its operating philosophy, facilities, and abilities. Fully illustrated, its 42 pages form a complete source book of steel fabrication services covering: *Structural Steel; Steel Building Products; Warehouse Steel; Standard and Custom Steel Buildings; Farm Buildings; Aviation Buildings; Hangar Doors; Industrial Doors; Railroad Car Component Parts; Stainless Steel Products; Revolving and Swing Door Entrances.*

Here, in fact, is an invaluable buying guide — not just another "company history" — that the above coupon brings you. Please mail it *now*, as supply is limited.





Structural framework for new plant of Marshall Planing Mills, Inc., at St. Matthews (Louisville), Ky. Standard Bowstring Installation and Steel Beaded Sheet Roof by INTERNATIONAL STEEL COMPANY.

INTERNATIONAL SERVICE

2056 EDGAR ST. EVANSVILLE, IND.

INTERNATIONAL STEEL COMPANY

gineered timber in the West and particularly in California.

It is safe to say that a large majority of recent California school buildings have been of wood frame construction, or of Type III—masonry walls with wood roof structure. Comparative cost data, which conclusively demonstrates the economy of wood as a structural material, can be found in two publications: "Comparative Costs for School Buildings," issued by the National Lumber Manufacturers Association; and "School Buildings Your Tax Dollar Can Afford" issued by Timber Engineering Co. The information contained in these booklets shows the way for other sections of the country to take advantage of the economies offered by well conceived and well designed timber construction.

We have been privileged to have participated in the school building program in the West and feel that we, along with other members of the American Institute of Timber Construction, have done much to insure the economical construction of hundreds of classrooms, multi-purpose rooms, gymnasiums, etc. The success of this program is very largely due to the important part played by glulam beams and arches. Through their unique ability to provide architectural beauty, along with excellent structural properties, they permit the use of exposed structural elements without the sacrifice of architectural effect.

Experience has shown engineered timber construction to be highly fire resistant, structurally sound, architecturally beautiful and economical. Many more schools could be built annually with the available dollars if school boards would insist on buildings incorporating engineered timber construction in their design.

MacGregor Graham
Sales Manager,
Timber Structures, Inc. of Calif.
Richmond, Calif.

A Tribute

Sir—Engineers as a class seldom pay public tribute to their colleagues during the short span they spend on this earth. True recognition of a man's greatness does not come forth usually until after his death.

I am reminded of this by reading in the pages of ENR, June 16, 1955, of David B. Steinman's gift of a scholarship to The Newark College of Engineering.

While foreign governments have conferred honors upon Dr. Steinman, it appears as a slight that his own

(*Continued on page 42*)

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product

American Cable
TRU-LAY VHS **15%**
STRONGER

NOW At Your Distributor
The New Wire Rope That's Breaking All Records

For Shovel Hoist Ropes, Scraper Ropes and Draglines
Your American Cable Distributor now has Draglines, Shovel Hoist Ropes and Scraper Ropes made of New TRU-LAY VHS. This new wire rope was specially developed for these toughest applications in the construction field. It is 15% stronger than Improved Plow Steel, which was the strongest grade available until now.

Heavier Loads—Higher Safety Factor
With New TRU-LAY VHS you will be able to handle heavier loads with the same diameter line. And its greater strength means a higher factor of safety during its entire service life.

Tougher . . . For Longer Life
In addition to its greater strength, new TRU-LAY VHS is also tougher . . . more wear resistant. And it has all of the advantages of preformed construction. This means longer life under the rough treatment that Scraper Ropes, Shovel Hoist Ropes and Drag Lines necessarily get.

Less "Down Time"—Cuts Costs
Because it is tougher and more wear resistant, TRU-LAY VHS rope lasts longer, costs less to use and cuts "down time" of equipment for wire rope replacement.

TRU-LAY VHS ropes are easy to order. Just ask for TRU-LAY VHS Shovel Hoist Ropes, Scraper Ropes or Draglines, in the size you want. You don't need any complicated specifications.

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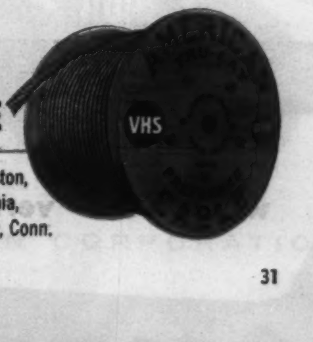

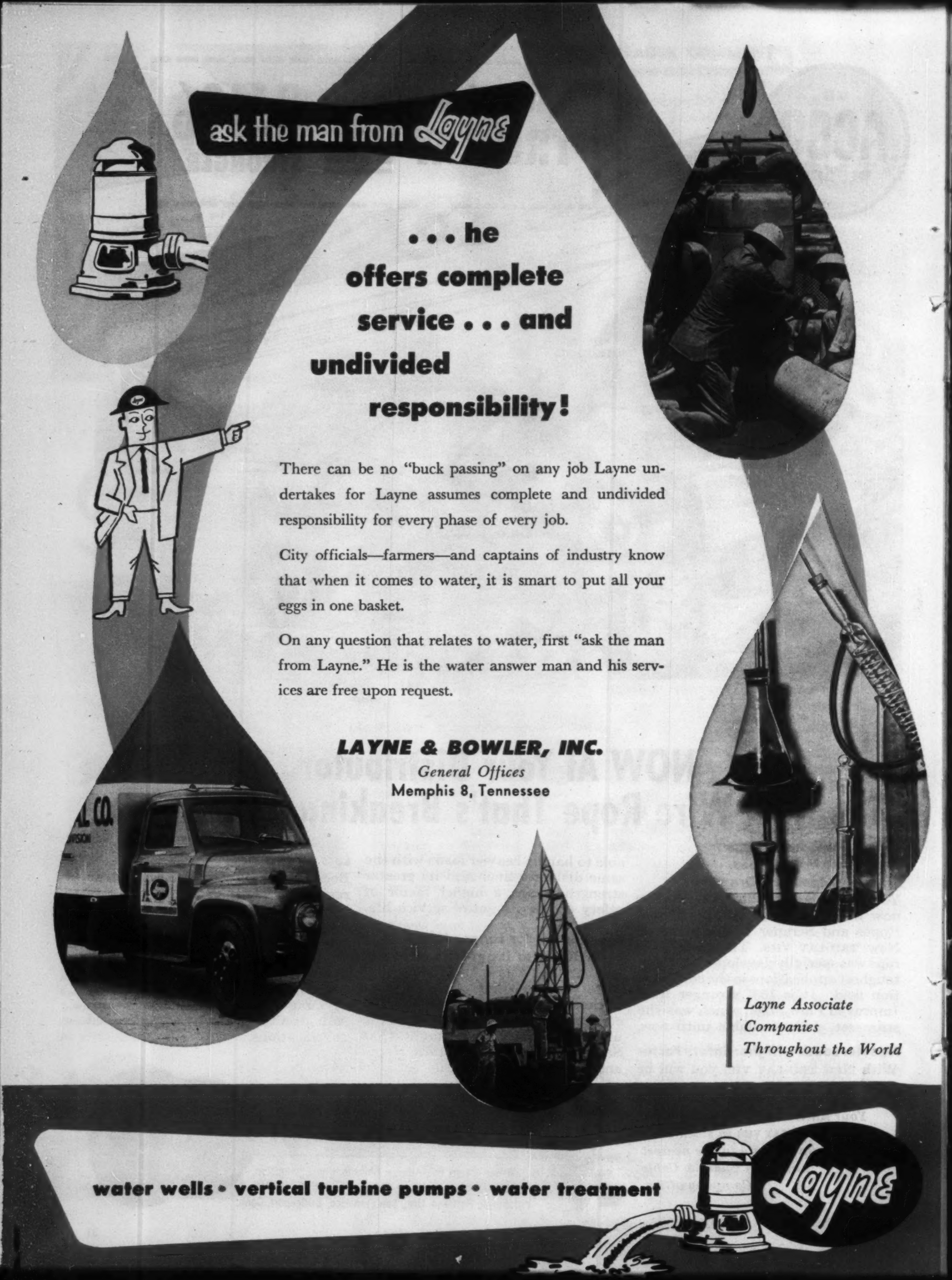

ask the man from Layne

. . . he offers complete service . . . and undivided responsibility!

There can be no "buck passing" on any job Layne undertakes for Layne assumes complete and undivided responsibility for every phase of every job.

City officials—farmers—and captains of industry know that when it comes to water, it is smart to put all your eggs in one basket.

On any question that relates to water, first "ask the man from Layne." He is the water answer man and his services are free upon request.

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Layne Associate
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water wells • vertical turbine pumps • water treatment

Layne

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6x37
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YOUR WICKWIRE ROPE DISTRIBUTOR SUPPLIES THE ANSWERS TO WIRE ROPE PROBLEMS

One of the best ways to find out "what goes" is to be right on the spot. That's why a Wickwire distributor is a wire rope expert—he practically lives with the industries he supplies with wire rope. He knows his customers' specialized problems from first-hand experience, and is able to give competent practical advice on the best construction—6x19, 6x37, 8x19, etc.—for them to use. And he delivers the type, size and length of wire rope they need directly from his warehouse stocks. They save time . . . storage space . . . paper work.

Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

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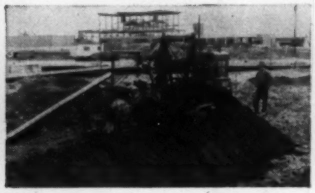
LARGE PIPELINES

UTILITY SERVICES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DRAIN TILING

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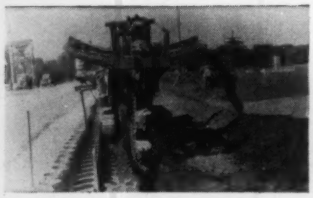
SMALLER PIPELINES

Good Everywhere

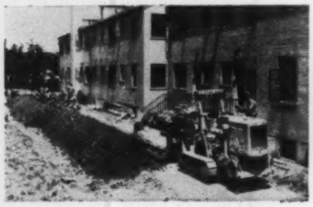
CLEVELAND
TRENCHERS and BACKFILLERS

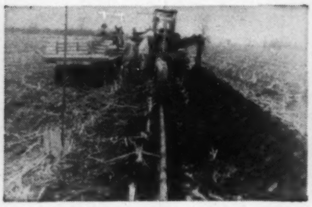

HIGHWAY DRAINAGE

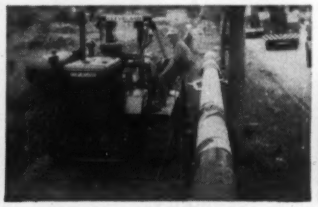
HIGHWAY WIDENING

CONDUIT AND CABLE

SEPTIC TANK BEDS


SEWER AND WATER


FARM DRAINAGE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THE CLEVELAND TRENCHER CO. • 20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

CLEVELAND

LARGE SIZE AIRTHERM ROOF DECK REDUCES COST 10%

TWO PANELS COVER 100 SQ. FT.

- fewer laps
- more rigid construction
- greater fire resistance

ARE YOUR JOBS GETTING THE LOWER COST BENEFITS OF AIRTHERM ROOF DECKING?

No construction delay because of weather—that's the reason steel decking saves invaluable time and money. Airtherm large size Decking reduces labor and handling costs as much as 10% by actual installation reports. This results in additional time savings, quicker occupancy, fewer laps, greater structural strength, and a more fire and buckle resistant roof. Make us prove Airtherm's advantages on your next roof deck job. Phone, wire, or mail coupon.

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Airtherm Manufacturing Co. Dept. G.
700 S. Spring
St. Louis 10, Missouri
Gentlemen:

Please send complete information on Airtherm Roof Decking.

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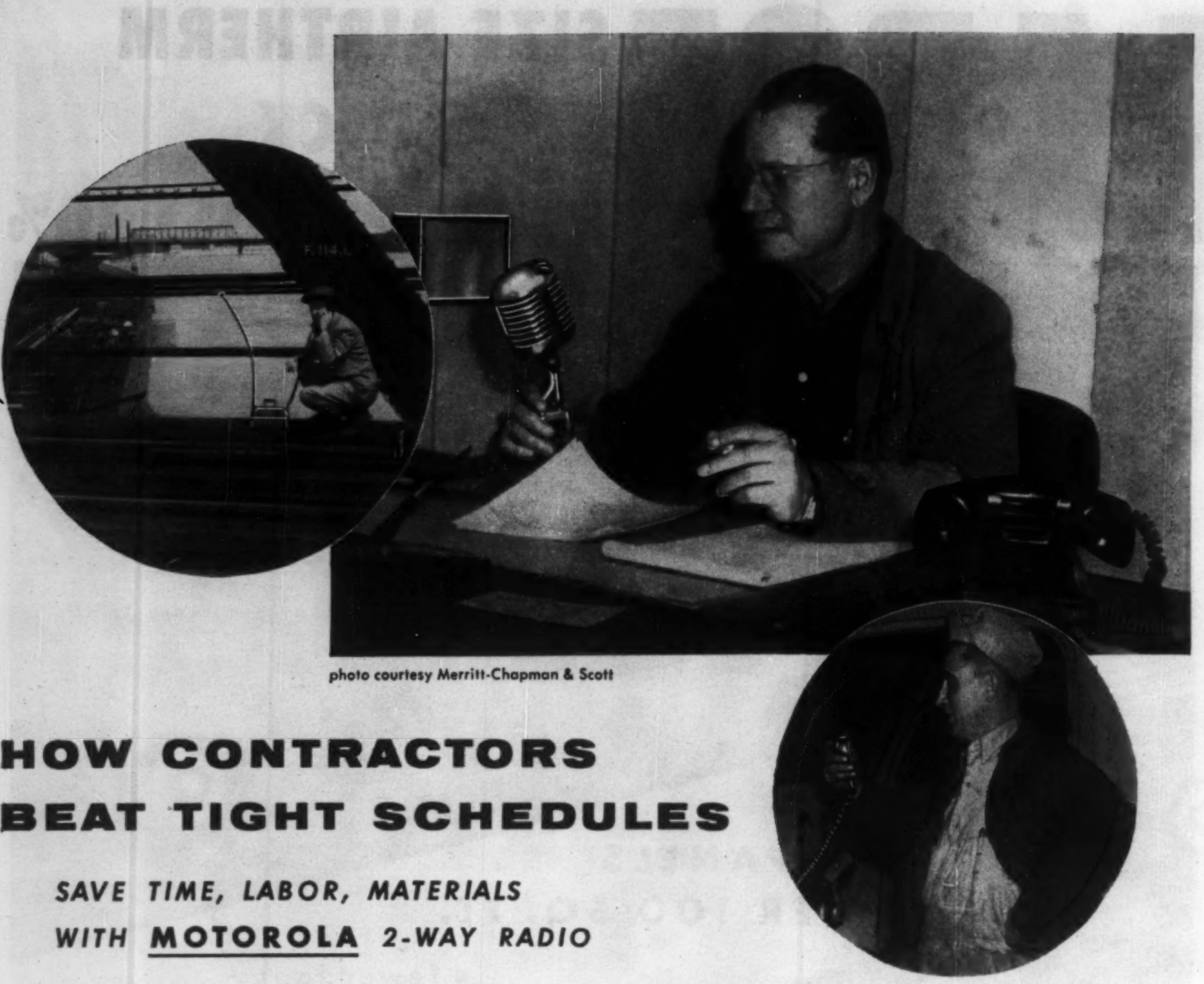

photo courtesy Merritt-Chapman & Scott

HOW CONTRACTORS BEAT TIGHT SCHEDULES

SAVE TIME, LABOR, MATERIALS WITH MOTOROLA 2-WAY RADIO

With construction work usually sprawled out over a large area and working sites changing frequently, Motorola 2-way radio ties the whole operation together with the most versatile, quickest communications possible . . . gets the job done faster and at less cost.

With radio, key personnel, foremen and superintendents have constant contact with every part of the project. They can answer questions or get their questions answered and give orders without spending non-productive travel time or leaving their posts where they're needed most.

Problems that would take hours to solve are taken care of in minutes using 2-way radio. Equipment needed on a temporary basis is directed to various assignments by radio without wasting any motion or returning "home" first. When breakdowns leave valuable men and machines idle, radio dispatches help immediately, gets them back to work faster. Concrete placing crews can radio changes in requirements to the batch plant immediately and accidents gets fast attention.

Get the facts. Find out how Motorola 2-way radio will pay for itself in a remarkably short time and then add clear profits for you for years to come. To get *all* the advantages radio offers, *insist* on Motorola, serviced by the Motorola man right in your area. Write today for his *experienced* help in planning your radio system.

MOTOROLA

2-WAY RADIO

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
4501 AUGUSTA BOULEVARD • CHICAGO 51, ILLINOIS
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Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service —
specialized engineering . . . product . . .
customer service . . . parts . . . installation . . .
maintenance . . . finance . . . lease
"The best costs you less — specify Motorola."

5 years of job-proved savings in portable air-power costs

600 cfm GYRO-FLO portable compressor serving two Wagon Drills on a highway improvement project.

600 CFM GYRO-FLO rotary compressors

Five years ago, Ingersoll-Rand pioneered a new revolutionary portable compressor with no pistons, rings, rods or valves—the 600 cfm GYRO-FLO. Its advantages over the reciprocating compressor were so great that it looked almost too good to be true. Hence there was much speculation as to how it would stand up under actual on-the-job conditions.

Today, there can be no room for doubt. The 600 cfm GYRO-FLO has won its service stripes in the world's toughest proving ground—the heavy construction field. Five years of performance on all kinds of jobs have proved its outstanding economy, dependability and remarkable freedom from maintenance. Smaller—lighter—smoother running—air temperatures under 200°F—low oil consumption—closer regulation at all loads from 0 to 100% capacity. These advantages are a matter of record.

Available in 125, 210, 315 and 600 cfm sizes, the GYRO-FLO, with five years of time proven experience, stands out as the finest portable air power plant obtainable. Ask your I-R representative for the complete, cost-saving details.

Ingersoll-Rand
2-227 11 Broadway, New York 4, N. Y.

IR CONTRACTORS' COMBINATION

COMPRESSORS • ROCK DRILLS • AIR TOOLS • CARSET JACKBITS • PUMPS

2

TWO FOR THE ROAD

Watch a new highway under construction and chances are that Berger Instruments—like these latest model transits—are marking them out precisely—the 6¼" transit for the most exacting requirements; Polara for the less complex. Just as so many Bergers have been doing for over 84 years everywhere in the world—on roads, large and small buildings, bridges and every type of construction project.

If you've never owned a Berger, you owe it to yourself to learn how accurate it really is . . . how little repair it requires . . . the lifetime of trouble-free service you can count on . . . how inexpensive a Berger Instrument is in the long run.

Put yourself behind a Berger—so many road builders do. Write for "Accuracy in Action". C. L. BERGER & SONS, INC.
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THE BEST IN SIGHT IS

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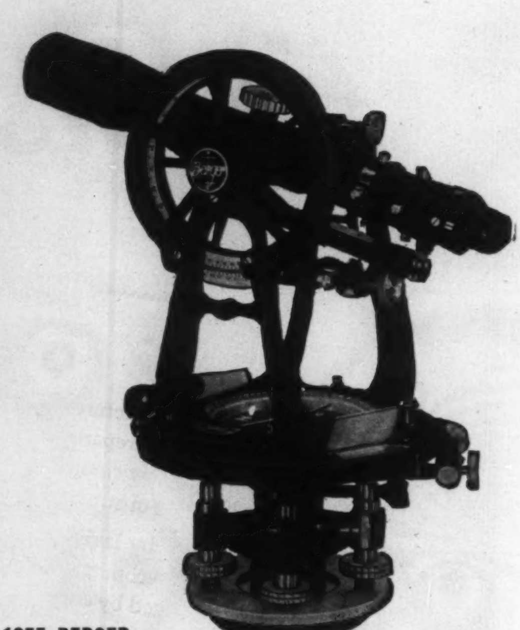
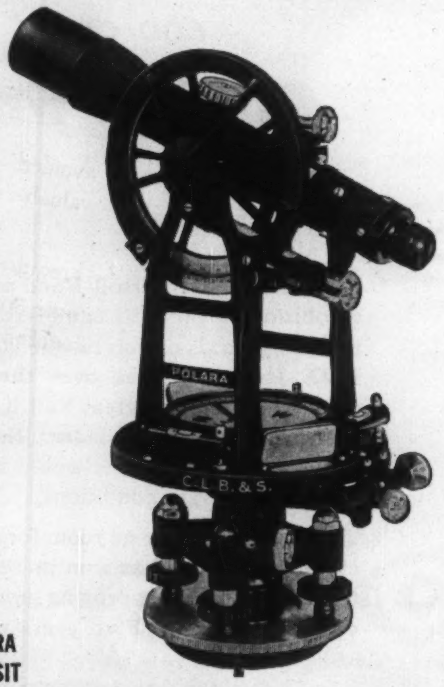
ENGINEERING AND SURVEYING INSTRUMENTS . . . SINCE 1871



1955 BERGER BRONZE TRANSIT

Supreme achievement of 84 years of instrument making. Newly designed optical system, 6¼" transit has 26 power telescope, coated optics, resolving power 3½ sec., effective aperture 1.430 inches (36mm), field of view 1 deg. 6 min. Fully enclosed nickel silver leveling screws, replaceable bronze bushings, 3¾ ft. short focus. Reversion vial included. Mahogany transit case and white ash tripod at no extra cost.



POLARA TRANSIT

Exceeds government specifications for 5½" transits—fills need for accurate low cost standard engineers' transit reading to one minute. Brass and bronze construction, light weight. 5½" horizontal circle; 5" vertical circle. Newly designed optical system for precise stadia readings at greater distances. 22 power telescope with resolving power of 4 sec. Short focus 3 ft. Fully enclosed nickel silver leveling screws. Mahogany transit case, white ash tripod at no extra cost.

IRVING GRATINGS UNEXCELLED From Every Angle!

Engineering-Wise:

1. Irving *specializes* in the manufacture of *all types* of gratings. Irving engineers are prepared to handle any grating problem, no matter how complicated (such as proper fit, unusual conditions of stress, corrosion, etc.).
2. Complete pre-order service by Irving estimating staff includes prompt, accurate recommendations and quotations. All orders are checked by engineers with years of specialized experience.
3. Comprehensive drafting organization assures precision manufacture plus uninterrupted flow of production; accurate erection drawings supplied with every order.
4. Prior to shipment gratings are carefully inspected for conformity to specifications and to Irving high standards of quality.

Economy-Wise:

- Precisely fabricated panels make installation easier, faster.
- Costly mistakes are avoided by utilizing up-to-date engineering skill and valuable experience unique with Irving.
- Irving quality gratings require minimum maintenance.
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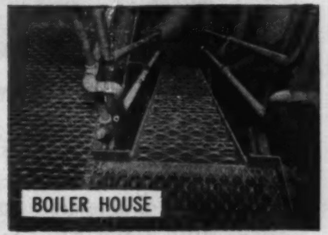
Performance-Wise:

OIL REFINERY

Non-skid; fireproof

BUS LAUNDRY

Strong; self-draining



Self-ventilating; durable

SEWAGE PLANT

Irving ALUMINUM Gratings–rustproof, sparkproof, lightweight

PIONEERS of the OPEN METAL FLOORING INDUSTRY

ESTABLISHED 1902

IRVING SUBWAY GRATING CO., INC.

Plants:
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Write today for our illustrated catalog containing engineering data on Irving Riveted, Welded and Press-locked gratings that will save you time and money!

MUELLER®

Connect Branch Mains...

quickly
safely
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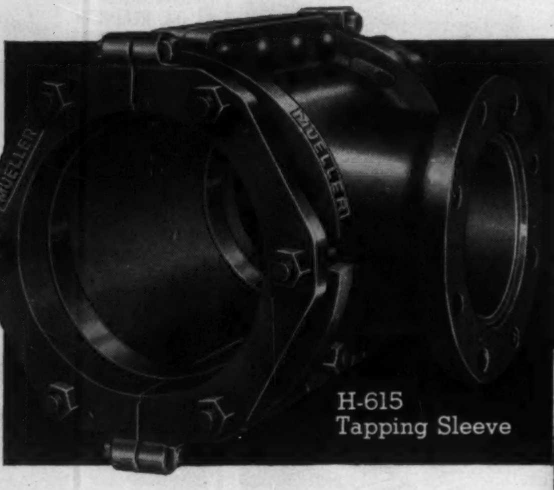
under pressure!



H-615
Tapping Sleeve

H-667
Tapping Valve

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CHATTANOOGA TENN
175 W
AWWA
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Mueller Tapping Sleeves and Valves are the most practical—and economical—means of connecting lateral or branch mains. Connections are made and lateral is put in service under pressure with a Mueller "CC" or "C-1" Drilling Machine—no shutdown, no loss of water, no interruption of flow in main!

Heavy duty construction and extra length of mechanical joint tapping sleeve assures maximum rigidity and strength. One mechanical joint sleeve of a nominal size will fit all classes of cast iron pipe regularly used by using only two sets of gaskets. Main sizes from 4" through 12" with various combinations of outlet sizes 2" through 12" are available.

Special mechanical joint tapping valve has oversize waterway—allows full-size cut for maximum flow. Exclusive four-point disc wedging mechanism assures tight shutoff and trouble-free operation. Available with "O" rings or conventional packing in sizes 2" through 12".

Tapping Crosses, Split Repair Sleeves and Cut In Sleeves and Valves are also available with mechanical joints.

Calked type tapping sleeves are available which will fit all classes of pipe for mains 3" through 36" with various combinations of outlets 2" through 16". Calked type tapping valves are available with "O" ring or conventional packing or flanged type for post indicator, with conventional packing only—sizes 2" through 16".

Consult your Mueller Representative, Catalog W-96 or write direct for full details.

MUELLER CO.

Dependable Since 1857

MAIN OFFICE & FACTORY DECATUR, ILLINOIS

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MAINE
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KENTUCKY
NEW HAMPSHIRE
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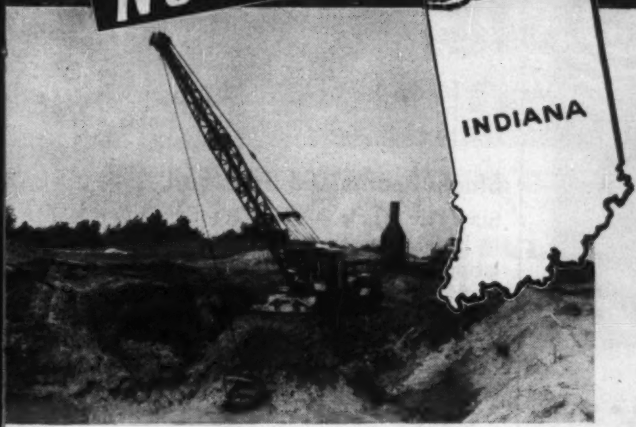
NOW INDIANA

PETER KIEWIT SONS CO. uses a 22½-ton Lorain Moto-Crane, model MC-424, with 50-ft. boom, handling concrete bucket on railroad overpass construction on $5-million contract C-6 east of Gary. This Omaha, Nebraska, contractor has purchased 44 Lorains.



TAYLOR WHELESS & CO. of Jackson, Mississippi (joint contractors with Winston Bros.) use a 20-ton Lorain Moto-Crane as a dragline to excavate footings for an overpass on contracts C-17, 18, 19 ($7,500,000) near La Porte, Indiana. Also used to handle concrete, forms, steel and clamshell excavation.

ANOTHER TURNPIKE

MORE LORAINS... *MORE* PROOF!

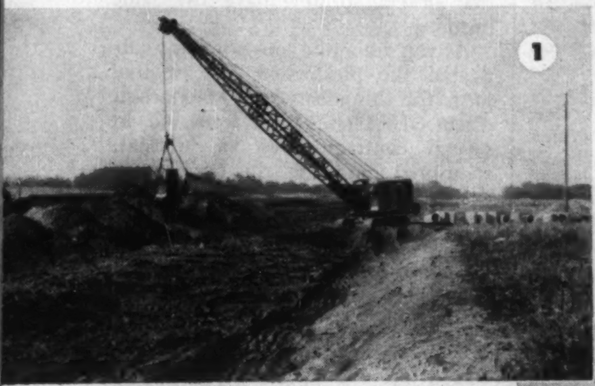
Ever since the first yard of earth was moved on America's first super-highways, Lorains have been a familiar sight . . . from the Pennsylvania Turnpike to the current Indiana Turnpike. Hundreds of Lorains have seen duty on these closely bid, tightly scheduled contracts. Contractors' names through these years on these jobs are the "Who's Who in American Construction."

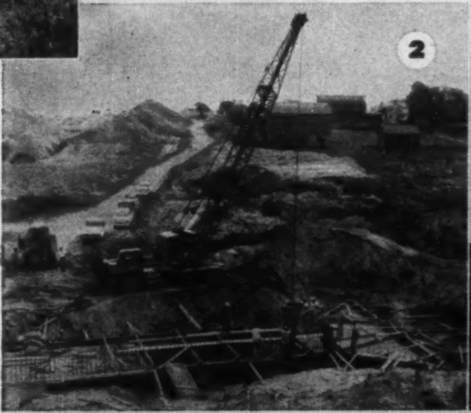
Now, the 156-mile, $280-million Indiana Turnpike is the latest of these "proving grounds" for Lorains as they help dig the 50,200,000 yds. of material, help pour the 300,000 yds. of concrete on the 260 structures, help place the 86,000 tons of steel.

Shovel-crane equipment, particularly on vast projects like this, must fit many kinds of work — digging, casting, erection, material handling, to mention a few. Lorains do that best of all because of the tremendous selection of shovel-crane sizes through 2½-yard shovels and up to 61-ton crane capacities . . . plus the convertibility to all front ends . . . plus many types and sizes of rubber-tire and crawler mountings available for any terrain or travel conditions.

Many years and many turnpikes are your proof that Lorains will lick rough, tough, fast-scheduled jobs . . . and prove they'll *move more material, faster, cheaper, on your job, too!*

THE THEW SHOVEL CO., LORAIN, OHIO





① This 1½-yd. Lorain dragline uses a 60-ft. boom to dig drainage ditches 6 feet deep, 28 feet wide, at the rate of 250-ft. per day on the Carlson-Fleming subcontract near Rolling Prairie, Indiana.

② Winston Bros. of Minneapolis (joint contractors with Taylor Wheless & Co.), an 8-time Lorain owner, use a 25-ton Lorain Moto-Crane to handle 1¼-yd. concrete buckets to pour box culverts, handling about 30 loads per hour. This Moto-Crane is assigned to many other varied duties all over the job.

③ This Lorain 30-ton Moto-Crane, model MC-524, with an 80-ft. boom pours concrete for an overpass on the S. J. Groves & Sons Co. contract near La Grange, covering 12 miles and totalling $6,740,000.

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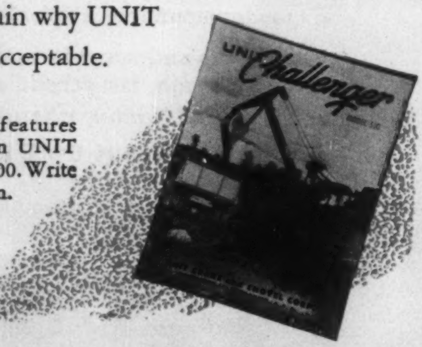
See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



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country has not bestowed national honors upon him for his engineering and humanitarian accomplishments. As a former employee of Dr. Steinman it is my privilege to know the man not only as an engineer, but in addition as a great humanitarian and poet whose esthetic sense could see beauty as a necessary element in the engineering structures he designed.

Dr. Steinman has dedicated his person and his fortune to the advancement of the engineering profession as no one else has. A list of all of his activities in sponsoring the growth of the engineering profession would show achievements far in excess of any other engineer of our times.

George D. Hartley
Drahran, Saudi Arabia

Block Beams Did Not Fail

Sir: The article, "Novel Roof Fails," in ENR Aug. 25, p. 23, stressed a relationship between prestressed concrete roof joists and the failure of conventionally reinforced cast-in-place rigid-frame bents. This, I am sure, was not your intention, but readers who know nothing of the job and its background would receive this impression from the article.

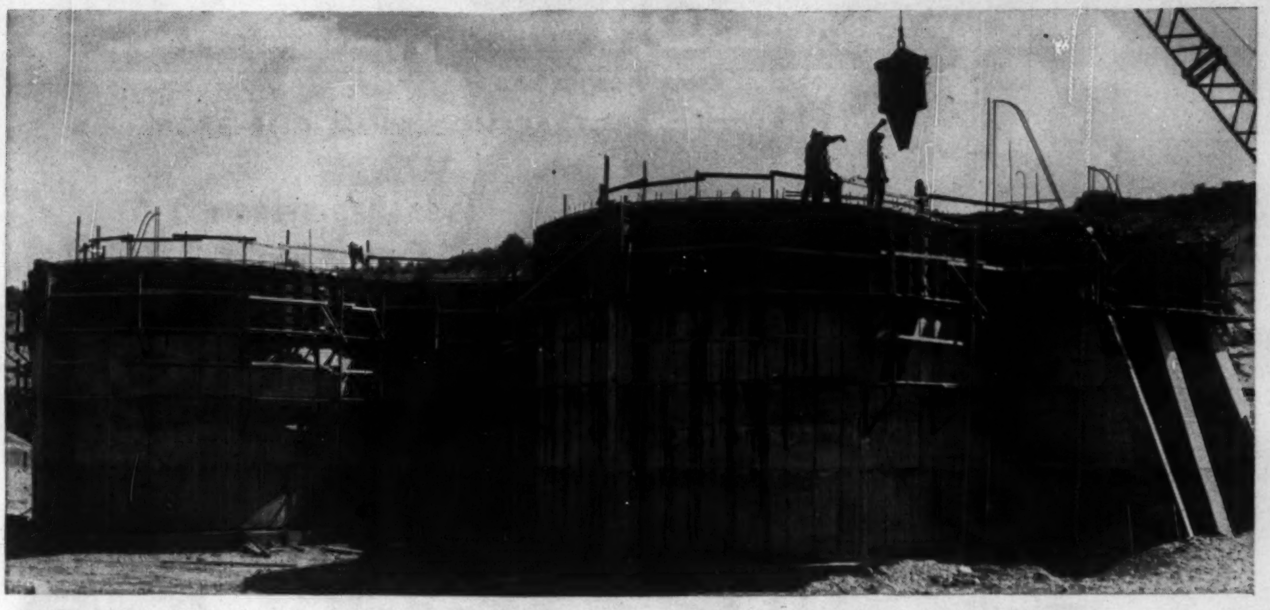
You are certainly to be commended for your promptness in reporting this serious mishap; the causes of failures as they become ascertained should be pointed out by your magazine in order that others do not make the same mistake.

As you are aware, our company fabricated the prestressed, precast roof joists for this job, which your article discussed. These joists were bid by several contractors as an alternate sponsored by us to the basic Army design.

We had an opportunity to inspect the structure with Army and Air Force Engineers on the day following the collapse. The one obvious fact to all present was that the prestressed joists had nothing to do with the cause of this failure, where three adjacent bents of continuous rigid frames failed, dropping the prestressed joists and gypsum roof deck.

We cannot answer why this cast-in-place concrete structure failed. Your article suggested that the prestressed joists toppled some of the bents, by transferring the roof load—which may or may not have been the case. Assuming that this is so, it is a definite credit to the joists, as they were continuous over the rigid bents and should be expected to react in such a tough manner. (The basic design

(*Continued on page 55*)



STORAGE WALLS to hold sand and gravel, designed and engineered by Kaiser Engineering Co. Symons Pre-Fab Fir Plywood Forms were called upon for the work because they could be prefabricated to fit the need and on the basis of savings in time and money. Butler Construction & Engineering Co., Seattle, Washington, is the contractor.

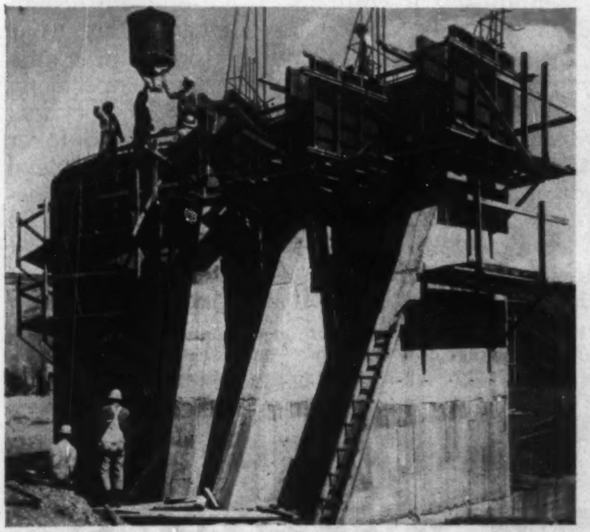
COST SAVINGS SELL SYMONS FIR PLYWOOD FORMS FOR 40 FT. HIGH "S" CURVED CONCRETE STORAGE WALLS

An unusual concrete construction job in Steilacoom City, Washington, involved the erection of two sharply curving free-standing concrete walls 40 feet high and 15 inches thick. The curves are shaped to a radius of 15 feet 6 inches. One wall is 190 feet long and the other is 400 feet long. They face each other across a space of 200 feet.

The curving surface of the walls posed a serious problem in forming. This was solved by the use of Symons Pre-Fab Fir Plywood Forms.

Most of the form panels were 2 x 6 feet with ¾ inch exterior *Plyform* faces framed on the edges with 2 x 4's and reinforced with steel cross members spaced 12 inches O.C. The job also required a number of filler panels 20 inches by 6 feet in which the plywood facing on each side extended past the framing 1⅛ inches, making it possible for the edges of the form to butt closely on the outside surface of the curves.

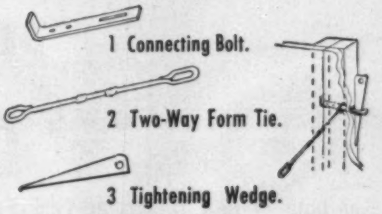
Symons Engineering and Customer Service also play an important role in projects where forming is a serious problem. The Symons Engineering Staff will furnish complete form layouts and job cost sheets on the form work—at no charge to the contractor. This service enables the contractor to get a clear picture of his job (its cost, bill of materials and labor saving methods). Symons fieldmen give regular on-the-job service. First, by on-the-job recommendations of forms and hardware needed. Second, by showing the workmen how to set up the forms efficiently. Third, by making special deliveries when last minute problems arise.



Abutment supporting ends of the 190-foot concrete sand and storage wall. Photo shows Symons Fir Plywood Forms being used for fourth pour on 40-foot high installation.

Symons Forming System includes just 3 pieces. TWO WAY FORM TIE which holds form securely to the required wall thickness without washers, spreaders or walers. Tie-ends are broken back within wall by a half-twist after forms are removed. TIGHTENING WEDGE is inserted through the slot in the connecting bolt and pulls form sides tightly together. CONNECTING BOLT which is slotted passes through edges of adjacent forms and tie loop.

JUST 3 PIECES



The Symons Forms are available on a Rental-Purchase Plan which offers contractors the opportunity to use the Symons Forming System on a rental basis . . . with all rental charges to apply on the purchase price, during a 60-day period.

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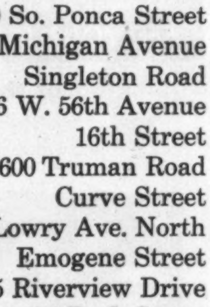

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J. W. Moorman and Son maintains an inventory of Aeroquip bulk hose and fittings at the Buford Dam Project.

50 pieces of heavy equipment work multiple shifts on the Buford Dam Project now under construction at Buford, Georgia, by J. W. Moorman and Son. 10 maintenance men and 2 service trucks are required to keep the equipment on the go. And a compact inventory of Aeroquip's bulk hose and fittings meets all fluid line replacement needs.

Shop Superintendent W. W. Hise reports, "Nearly every day we make an original equipment hose replacement using Aeroquip. The bulk hose idea cuts downtime."

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Downtime due to hose line failure is held to a minimum. Here a parts man selects fittings prior to assembly.

Hose is cut to length and fittings are attached in a few minutes. With Aeroquip, only ordinary shop tools are needed.

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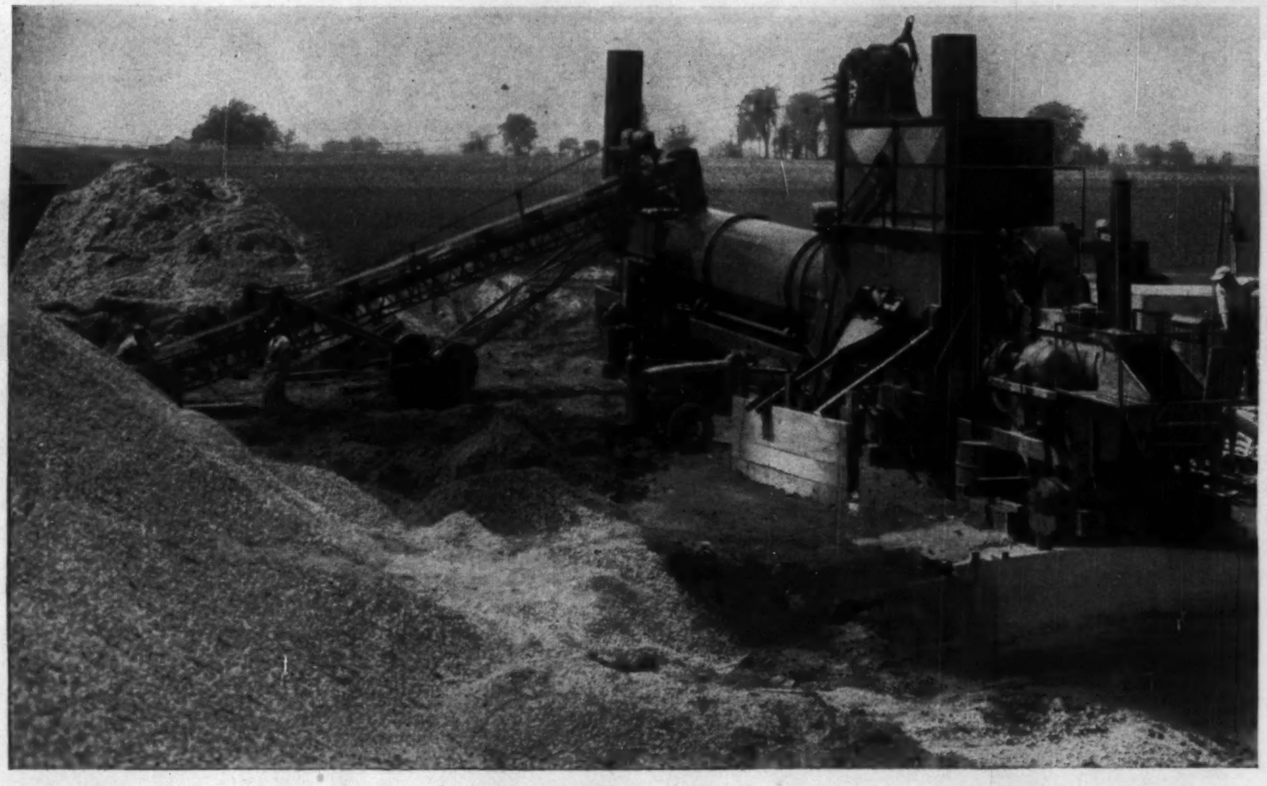

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Now let's examine performance. The steady, uniform, uninterrupted flow of material from the 81 keeps your trucks busy. You vary the mix by remote control of the bitumen pump or by adjusting the gates on the aggregate feeder without stopping the plant. Clam gates on the discharge hopper load your trucks without segregation, cutting off the flow when trucks pull in and out—again without slowing the plant. This famous *Continuflo* operation gives you more yards a day . . . *low cost* yards, too.

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Certainly, the extra heavy welded construction and use of the best pumps, bearings, and fittings obtainable have added a little to the manufacturing costs, but the next time you seek a blacktop job, just consider the 81 . . . and how it will let you turn in a lower bid.

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Third Unit	—	—	Dust collector
Auxiliary Units	Feeder elevator (with necessary feeder), hot elevator and fines feeder (if desired)	Feeder conveyor (with necessary feeder), hot elevator and fines feeder (if desired)	Feeder conveyor (with necessary feeder), hot elevator, burner and fines feeder (if desired)
Rated Cap.	40-60 yds./hr.	60-80 yds./hr.	80-110 yds./hr.
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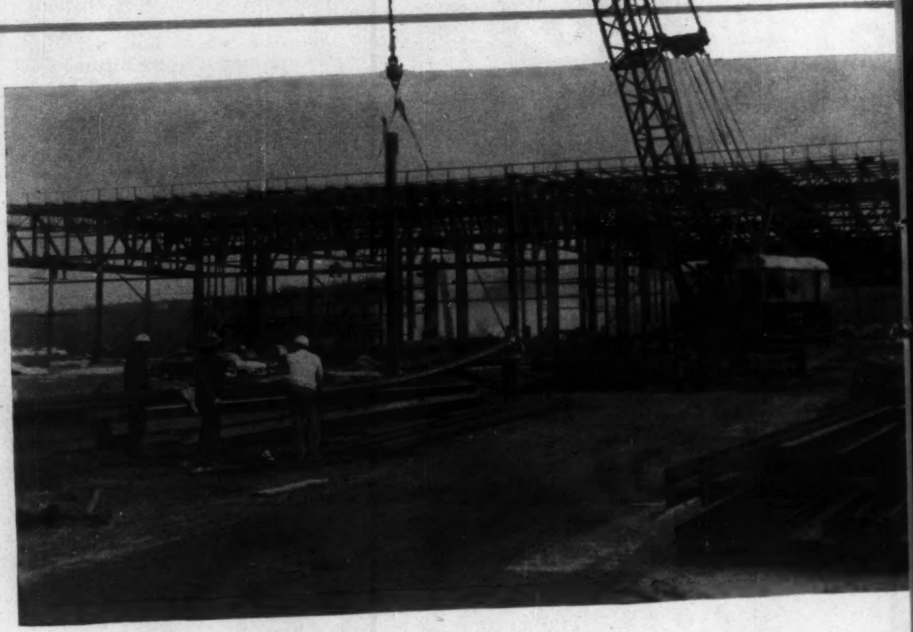
GULF PRODUCTS

D'Addario Construction Company, Bridgeport, Conn., recently completed moving more than 1,500,000 cu. yds. of sand and gravel to prepare the site for one of the largest Helicopter plants in the U.S.—the branch plant of the Sikorsky Helicopter Division of United Aircraft Corp., near Stratford, Conn. Harris Structural Steel Company, Bridgeport, Conn., is erecting the buildings, which will cover 750,000 sq. ft. Both contractors used Gulf products exclusively on this big job.



and **FINE SERVICE** *keep equipment rolling on helicopter plant project —one of largest in the U.S.*

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Here are some of the reasons why leading contractors like D'Addario Construction Company and Harris Structural Steel Company prefer to be served by Gulf: Gulf lubricants provide an extra margin of protection. Gulf fuels contribute to full power and top performance of equipment. Gulf supplies prompt delivery service and helpful petroleum engineering counsel.

Gulf products and fine service team up to help contractors reduce delays, cut maintenance costs!

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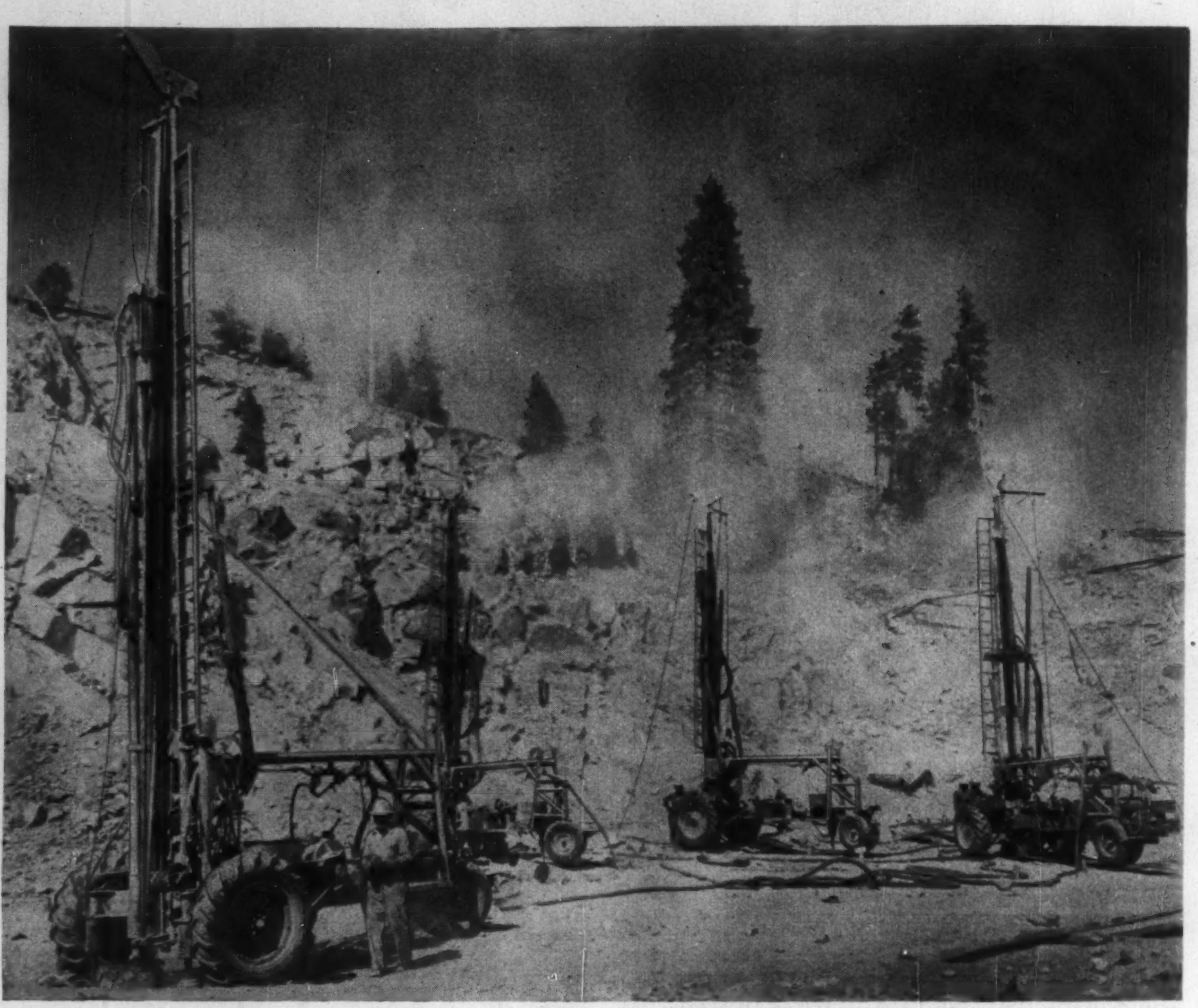
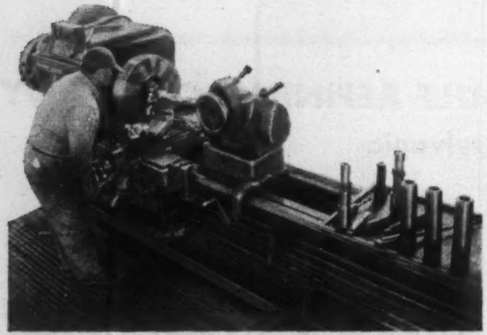


Crucible hollow drill steel at work on site of new Cherry Valley Dam.

A BIG BITE... 1½-million yards of hard granite



Machining a shank adaptor of Crucible Max-el 3½ alloy steel, for use on Joy *Challenger* drill.

That's the amount of hard rock the Guy F. Atkinson Company has now drilled through in constructing the new Cherry Valley Dam near Sonora, California.

For this tough job, two-inch round Crucible *Crusca* hollow drill steel is being used in eight big Joy *Challenger* drills.

As on so many other big jobs, Crucible drill rods were chosen because experienced construction men *know* they can depend upon them for *lowest cost per foot of hole drilled* — even under the most rugged conditions. And with good reason. For Crucible hollow drill steels are made to *tool steel* standards, by the country's leading producer of tool and other special purpose steels.

Choose them for your next job. You'll get top drilling efficiency, at lowest cost. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

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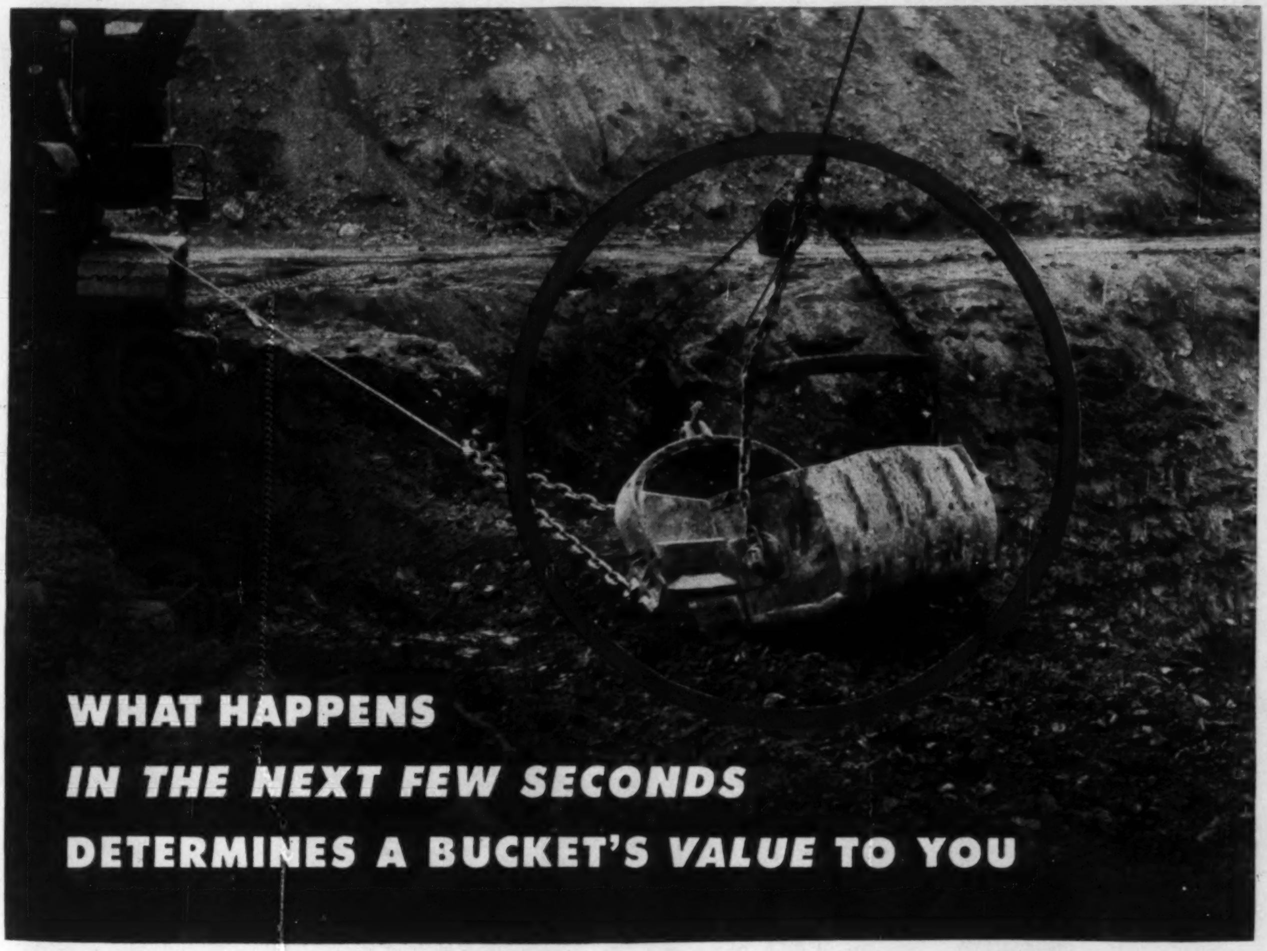
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DETERMINES A BUCKET'S *VALUE* TO YOU

If it's a Page Automatic . . . it starts digging sooner . . . fills faster and carries out more material than any other bucket

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READER COMMENT

called for continuous joists of conventional cast-in-place concrete, which undoubtedly would have also carried a portion of the load of the falling girder over to the next adjacent girders.) It appears that this very toughness of the prestressed joists may have delayed the falling roof long enough to permit depot employees to get out from under.

It is also significant that not one of the three rigid frames failed at the juncture with the precast, prestressed joists. Where the joists were pulled loose at the fire-wall spandrel beam, cast-in-place concrete pulled out and remained bonded to the precast concrete.

While the construction of this roof using precast prestressed joists is undoubtedly considered novel by some people, as the headline of your article states, there certainly is nothing novel about the rigid frame bents, which in this instance was the cause of collapse. The prestressed concrete was in no way related to the failure.

George W. Vaught
Concrete Masonry Corp.
Elyria, Ohio

CALENDAR

International Road Congress, Dolmabahce and Yilditz Palaces, Istanbul, Turkey, Sept. 26-Oct. 16.

Building Research Institute, conference on metal curtain walls, National Academy of Sciences, Washington, D. C., Sept. 28-29.

American Public Works Association, congress and equipment show, Milwaukee, Wis., Oct. 2-5.

First National Prestressed Concrete Short Course, Maritime Base, St. Petersburg, Fla., Oct. 10-12.

National Society of Professional Engineers, fall meeting, Peabody Hotel, Memphis, Tenn., Oct. 14-15.

Southeastern Association of State Highway Officials, annual convention, Charleston, W. Va., Oct. 17-19.

National Council of State Boards of Engineering Examiners, annual meeting, Sheraton-Park Hotel, Washington, D. C., Oct. 20-22.

Institute of Traffic Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., Oct. 23-27.

American Society of Civil Engineers, annual meeting, Statler Hotel, New York City, Oct. 24-28.

California Section, American Water Works Association, meeting, Memorial Auditorium, Sacramento, Calif., Oct. 25-28.

Associated General Contractors of America, Inc., Carolinas Branch, annual convention, Bon Air Hotel, Augusta, Ga., Oct. 30-Nov. 2.

American Concrete Institute, southeast regional meeting, Atlanta Biltmore Hotel, Atlanta, Ga., Oct. 31-Nov. 1.

Structural Clay Products Institute, convention, Greenbrier Hotel, White Sulphur Springs, W. Va., Oct. 31-Nov. 2.

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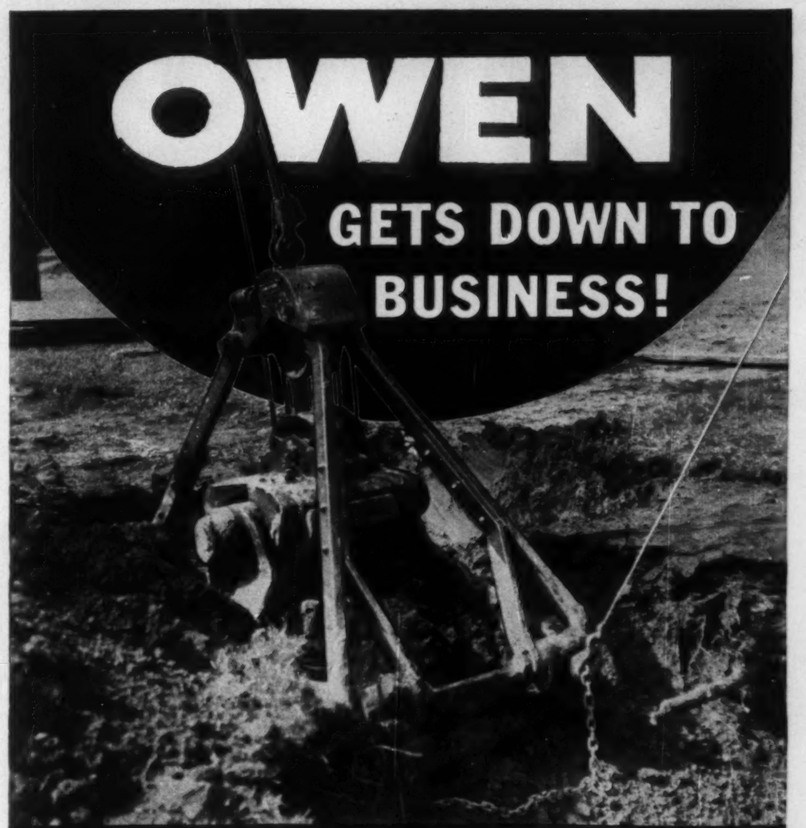

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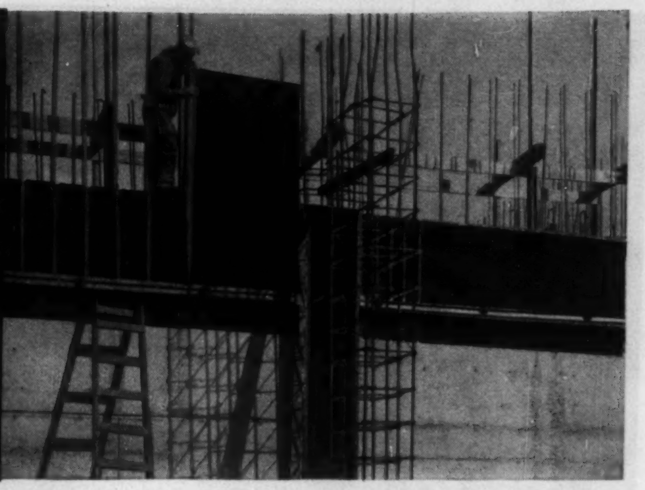

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SCHOOL—Paxon Field School at Jacksonville, Florida. Built in 1954 by East Coast Construction Company. President C. Bernard reports, "Harborite panels were re-used twenty times on each side...expect another twenty uses. Edges held up exceptionally well under rough usage and the finished concrete had a smoother finish than that obtained with other form materials."

ARENA—Livestock arena at the State Fair Grounds in Raleigh, North Carolina has drawn international acclaim for beauty and design. Harborite concrete form panels were used in construction of this unique structure. Seats 5400 spectators. Erected in 1953 by William Muirhead Construction Company. Architects were Matthew Nowicki and William Henry Dietrick.

OFFICE BUILDING—New headquarters for the Tacoma City Light offices completed in 1954. Roy T. Earley Construction Company used Harborite concrete form panels for entire exterior surface of building...re-used on adjoining shop building. Contractor says "...more than normal number of re-uses, stripping was easy, finish was held to a minimum." Architect was Silas E. Nelson of Tacoma.

APARTMENT—An outstanding new landmark on Seattle's skyline is the 900 University Apartment house. Harborite concrete forms were used exclusively on the exterior of this 22-story building. Only one set of forms was built. Says contractor Louis E. Baldwin, "These forms have been used 22 times each...are in good enough shape to use on another building of similar size. We recommend Harborite to any contractor." Architect, Earl W. Morrison.

Eighteen years of use in every type or concrete construction has proved that Harborite produces better jobs at lower cost. Harborite's medium-high density overlay is manufactured specifically for concrete form work. Tough, smooth surface will produce glasslike concrete until literally worn away through use. Re-use factor is exceptionally high—50 being common, 2 to 3 times amount not unusual. Special solid core construction of SUPER-Harbord boat plywood adds extra strength and durability. There is no plywood made that matches this material in all 'round quality.

Lower-than-average initial cost combined with high re-usage means important dollar savings. This, with the superior appearance of the finished concrete job, adds up to features that make Harborite a must for cost-and-quality-conscious contractors.

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- ✓ Solid core of best plywood made—SUPER-Harbord, the original boat plywood.
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One of the royal family of plywoods manufactured only by
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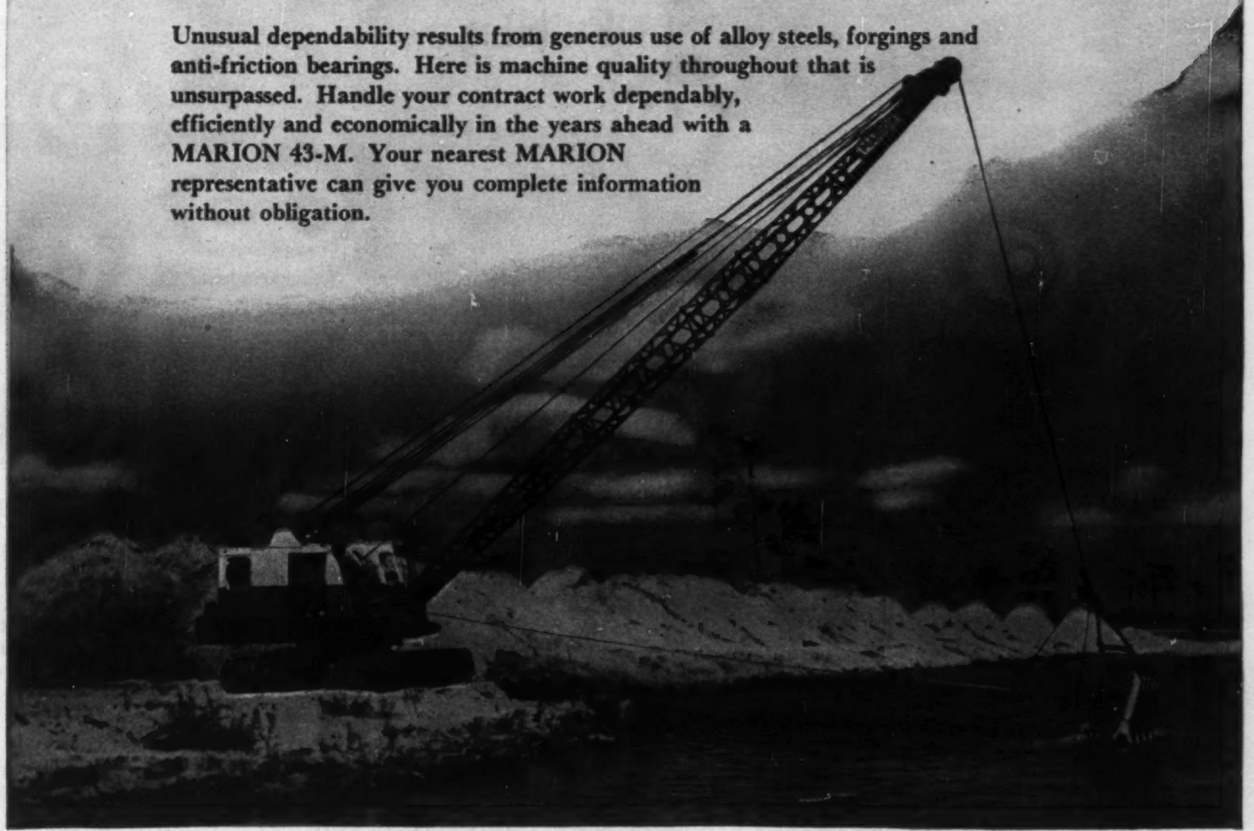

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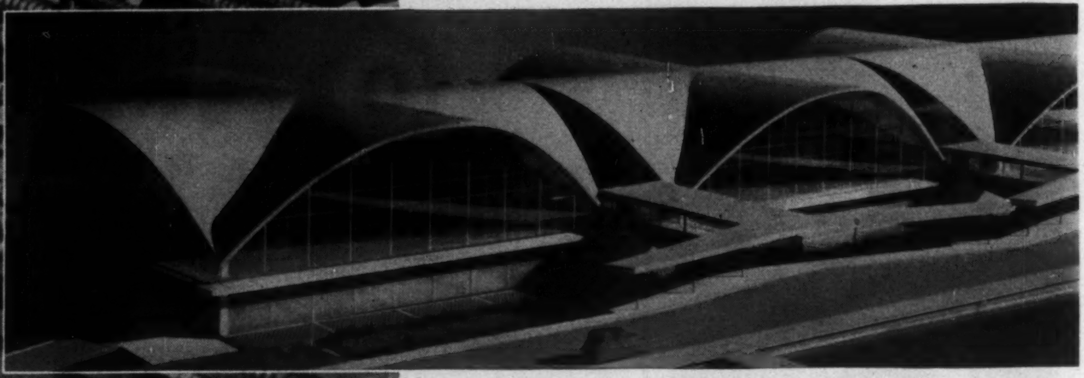

A bold new approach to airport terminal design has made the unusual structure pictured above, now being completed at St. Louis' Lambert Municipal Airport, a sensation in the architectural and construction world.

The obvious focus of attention is the massive but graceful roof, formed of huge intersecting cylindrical shells of concrete, 120 feet wide but only 4½ inches thick. The illusion is one of lightness and airiness, belying the roof's actual weight of 3,000 tons.

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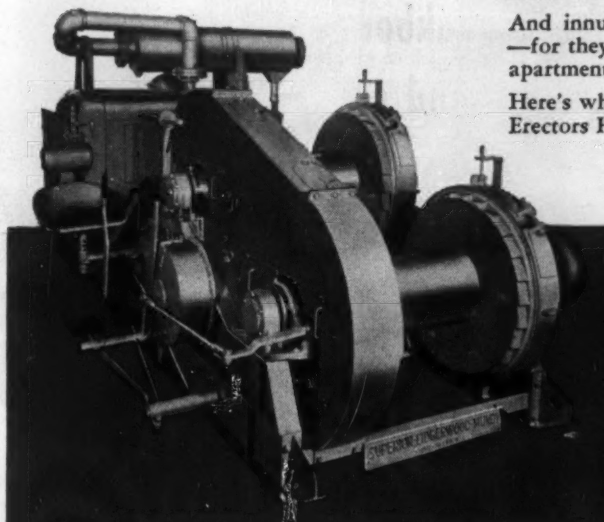

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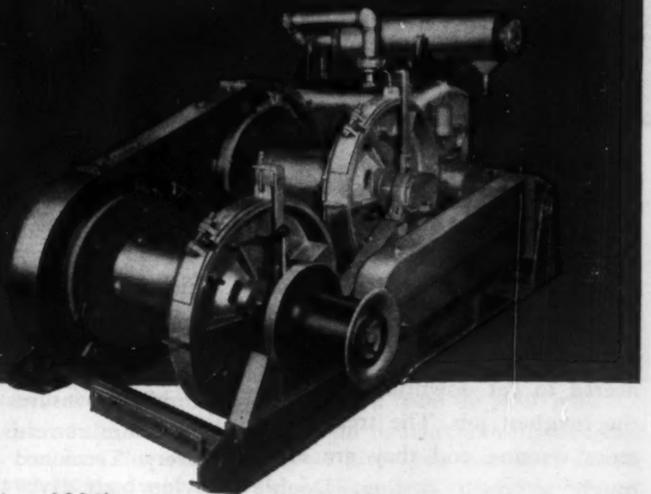

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PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.

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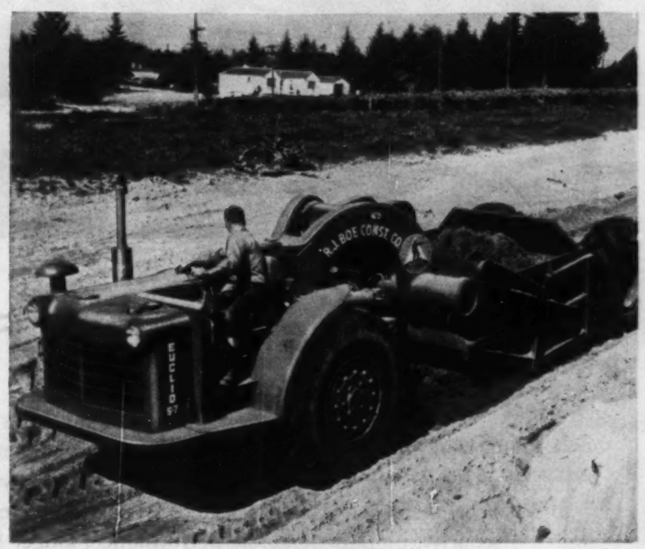
General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."

25% MORE WORK; FUEL COSTS ⅓ LESS

Killough Construction Company has *standardized* on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.



"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

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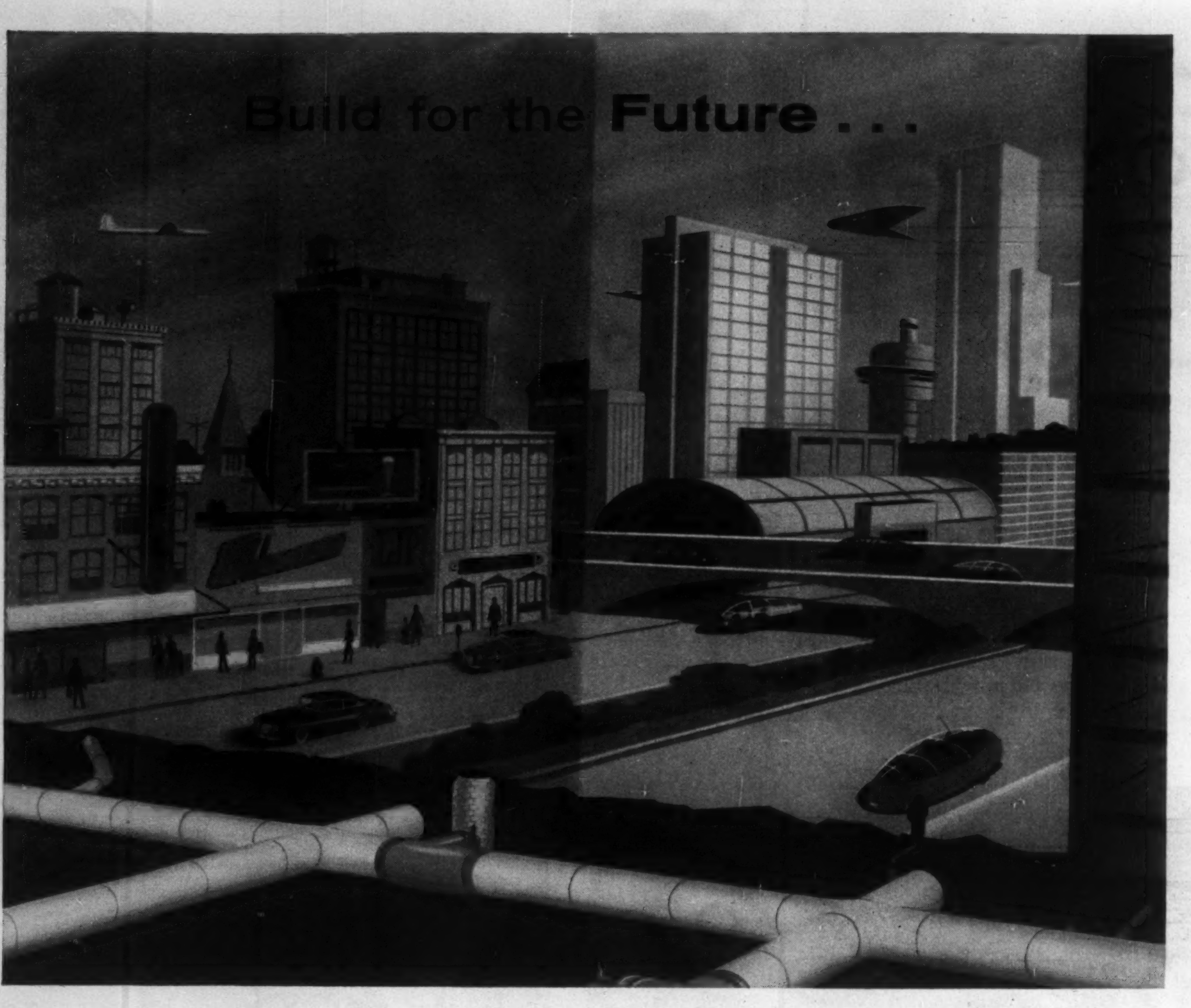
Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.



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City planners and engineers are taking a long, hard look at everything connected with water supply — the most serious problem affecting the city's future growth. That's why so many cities, all over the world, have selected Lock Joint Pressure Pipe's greater security, more dependable performance, longer life. They know that their plans for meeting future water supply requirements must include pipes whose high carrying capacity will be as great scores of years from now as it is today.

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ENGINEERING NEWS-RECORD

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Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Price 35¢ each copy except Annual Cost Issue. Semi-annual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

TURNPIKE MILESTONE—The Ohio Turnpike Commission this week proudly prepared for the grand opening on Oct. 1 of its 241-mi toll road across the northern part of the state between the Pennsylvania and Indiana borders (Page 71).

That the project met its deadline was of special significance because of the celebrated litigation that long delayed award of initial construction contracts. Few issues in recent years had so stirred the engineering profession and construction industry as the 1953 court battles over whether the Turnpike Commission was within its rights in calling for bids for concrete paving only.

The Ohio Supreme Court ended the year of intense controversy and gave the green light to construction by its far-reaching ruling that the commission was under no obligation to take alternate bids and that its judgment in selecting a specific material was not properly open to legal challenge as long as rendered in good faith.

WORKS BOTH WAYS—By coincidence, it was noted this week that the Connecticut Highway Department has begun taking alternate bids on the 129-mi turnpike now under construction between Greenwich on the New York line and Killingly on the Rhode Island border (Page 71). This project originally was designed for portland-cement concrete paving.

NEVER A DULL MOMENT—Almost every turnpike project, it seems, has to have its ups and downs. Jacksonville interests, for example, are raising Cain over engineers' recommendations that the Florida Turnpike by-pass their city (Page 76). But, Texas has come up with the prize dilemma: Will a private or public agency build the Dallas-Houston turnpike? (Page 371).

Privately-owned Texas Turnpike Co. has the exclusive franchise, but was unsuccessful in selling its bonds early this year. Now the Texas Turnpike Authority is thinking of having the engineering data re-checked to see if it is feasible for a private company to finance the toll road. The private group is going to try again soon to sell $130 million in bonds. But many Wall Streeters are doubting the bonds can be sold at a reasonable rate in today's tight market.

PULSE-TAKING—AGC came up this week with a happy prognostication, as its governing and advisory boards assembled in Minneapolis for their mid-year meeting. Polling its 84 directors and 124 chapters, AGC found:

85% to 90% of the general contractors in building, highway and heavy construction expect the record volume of work chalked up so far this year to continue or even go up in the next six months . . . with competition for jobs intensifying.

BORDEN
First IN FLOOR GRATING

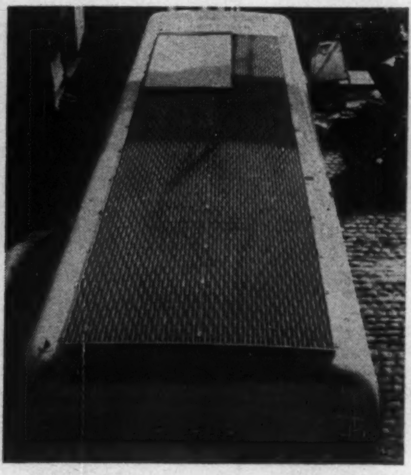
GRATING PLATFORMS for Scales . . . Will not collect snow, ice or become waterlogged; need balancing much less frequently; require no maintenance, yet bring you years of reliable service.

USES OF GRATING . . . WHERE ONLY BORDEN QUALITY WOULD DO . . .

Here on this page are a few of the many new or unusual uses for grating being pioneered every day. Each is an exacting job where only standards of quality equal to BORDEN'S will do.

And remember . . . BORDEN manufactures every type grating in ferrous and non-ferrous metals.

Television relay stations and radar stations that gird our continent have adopted grating as standard outside platform material. It will not collect snow as most other platforms will.



Wherever this Color Television truck goes, whatever the assignment of the reporters who must mount its roof, Borden riveted *serra-crimp* grating will mean surerfooting —even in ice or snow.

Only the finest precision manufacturing would satisfy the architect who designed this door. BORDEN is recognized as a leader in quality, custom-manufactured gratings.

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815 GREEN LANE Elizabeth 2-6410 ELIZABETH, N. J.
SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

WASHINGTON OBSERVER

Report on who should pay how much of highway costs will be ready by January according to officials of the Bureau of Public Roads. This assignment was given to bureau by Chairman Fallon of the House Roads Subcommittee.

Bureau has all divisions working up figures on how much damage is done to highways by trucks, passenger cars, buses, etc. Actually, Congress will determine who pays how much—but the Bureau of Public Roads report is, in fact, going to be taken by many as the answer to the thorny question of how to distribute additional taxes on highway users to pay for the new highway building program both the Administration and Democrats want.

The project has top priority inside the bureau. It is being supervised closely by three officials: Francis V. du Pont, Commerce Secretary Weeks' personal highway expert; C. D. Curtiss, Commissioner of the Bureau; and Frank C. Turner, former secretary of the Clay Committee who is charged with coordinating all the work on the project.

New tests sponsored by the Western Association of State Highway Officials in Idaho will provide BPR with latest evidence on the effect of truck traffic—this time on asphaltic concrete pavements.

Insiders expect the new report to show about the same conclusions as earlier tests on Portland cement concrete pavements—trucks do most of the damage.

•

The Administration has turned thumbs down on help for aluminum expansion. Mobilization Chief Flemming, as expected, has now made it official that the long-debated "third round of aluminum" expansion based on a variety of government aids to private producers will not be approved. From here on out, expansion will have to be undertaken by private capital without government commitments that help eliminate much of the risk.

Flemming also turned down more tax amortization for steel plants.

•

Housing officials have set their policy on allotting public housing projects. And rules will be spelled out this week officially by Public Housing Chief Charles Slusser. This year's program involves 45,000 units to be contracted for; this is 10,000 more than last year's law allowed.

Projects will go to cities that show the most need—backed up by the financial rating to carry it, plus plans that meet the government's standards. Geographical spread won't count especially.

Some 90,000 units are involved in planning loans already made by the agency. These plans are in various stages of completion—but it's expected that perhaps 65,000 units will be in competition for the 45,000 units to be contracted for this year.

Puerto Rico is already slated for 2,500 units. Cities will get their federal and annual contribution contracts starting around the beginning of next year.

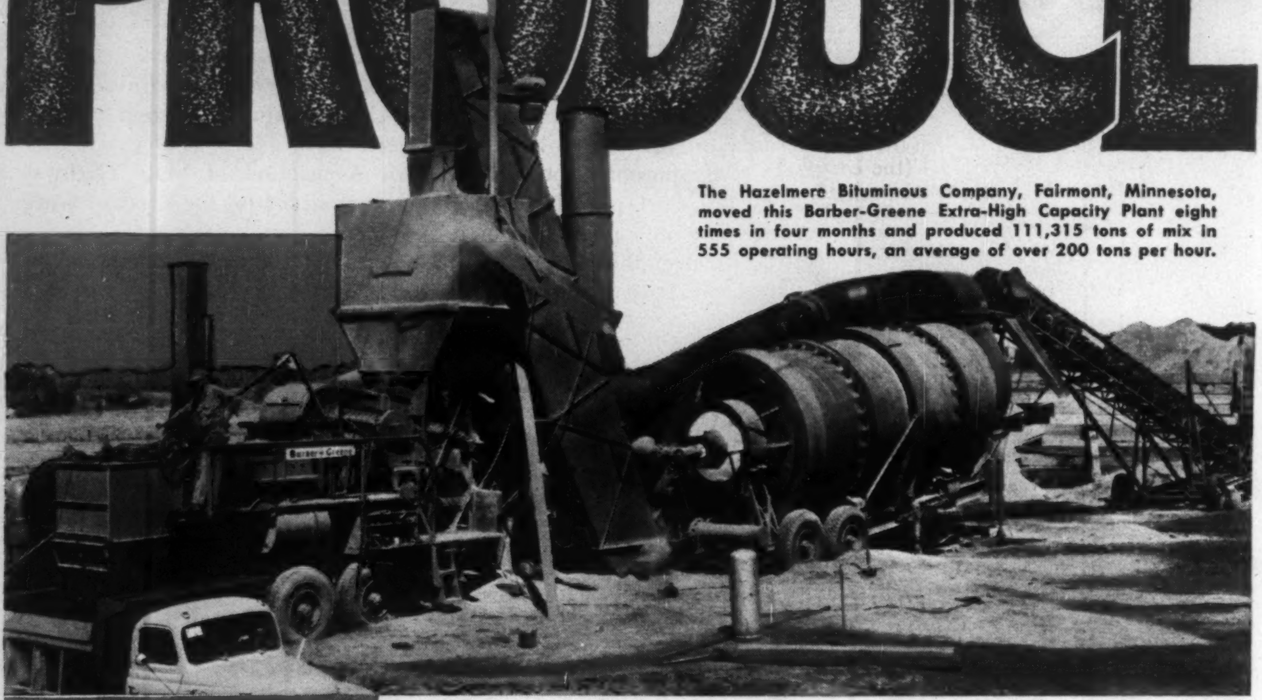
Projects won't be refused a city because it has no "workable program" of the kind now required for urban renewal help from the government.

•

New recommendations on federal building standards are available from the General Services Administration.

The standards apply to all federal office and commercial-type buildings. The new criteria for materials and design were drawn up by the Building Standards Advisory Panel appointed by Public Buildings Commissioner Peter A. Strobel about a year ago. Public Buildings Service has available a 20-page summary of the new standards; it contains all the main suggestions of the panel adopted by PBS and GSA.

PRODUCE



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Ohio Turnpike Opens on Time

Motorists will save over 3 hours, truckers 5 on 241-mile four-lane toll highway linking Pennsylvania and Indiana

Full-scale operation of Ohio's 241-mi turnpike is scheduled to get under way promptly at 12:01 AM, Oct. 1. At that time all barricades on the western 219 mi will be removed (the eastern 22 mi has been operating since Dec. 1 of last year) and traffic will start flowing over the entire $326-million toll road.

The free-flowing, four-lane divided toll highway connects at its eastern terminus with the Pennsylvania Turnpike; and at its western terminus with the Indiana Turnpike, now under construction.

In traversing the entire 241 mi of turnpike across northern Ohio, the average motorist will save three hours and twenty minutes in travel time, and the average trucker will save five hours. But this saving in time is only one of many features designed, engineered and built into the turnpike for the safety, comfort and convenience of the motorist.

• **Safety first**—Everything possible has been done to make this the safest of superhighways. Some of the safety features are unique even among toll roads. To point out a few:

• Wide shoulders—The 24-ft-wide eastbound and westbound roadway pavements of Portland cement concrete have bituminous paved shoulders, 8 ft wide on the inside for extra maneuvering room in emergencies and 10 ft wide along the outside for emergency parking.

• Intersections at grade—It is strictly a limited-access superhighway. All intersecting highways and railroads are carried either over or under the turnpike. A total of 282 structures carry highways over or under the turnpike and 40 structures carry railroads over or under the turnpike. In addition, there are 38 bridges over streams and 251 drainage structures.

• Restricted entry—No traffic will enter or leave the turnpike roadways except at interchanges, terminals and service plazas. There are 15 interchanges, each containing a toll plaza; 16 service plazas arranged in pairs along the turnpike; 8 maintenance areas; and one terminal with toll plaza near each end of the turnpike.

• Wide median strip—The opposing roadway pavements are separated by a 56-ft seeded and sodded median. It is depressed to facilitate drainage and snow removal, and to discourage motorists from crossing from one pavement to the other. This 56-ft separation of roadways is maintained over rivers, railroads and other highways by using twin bridges to carry the turnpike roadways.

• Fences and guard rails—The entire right-of-way is fenced along both sides to keep animals and pedestrians off the turnpike. And guard rails afford protection at structures and along embankments higher than 10 ft.

• Grades are easy—Maximum grades are 2% ascending and 4% descending. Minimum sight distance is 900 ft and maximum curvature is 2½ deg.

• Easy-to-read signs—Informational and traffic signs are large, briefly and plainly worded for easy reading at turnpike speeds. They are reflectorized for maximum night legibility. So-called "cat's-eye" markers along the outer edge of both roadways will guide motorists at night and in bad weather.

• Enforce speed limit—The entire turnpike will be well policed to protect the turnpike patrons as well as to enforce traffic regulation. Speed limits have been set at 65 mph for pas-

(Continued on page 72)

Connecticut 'Pike

Alternate bids required on two types of pavement

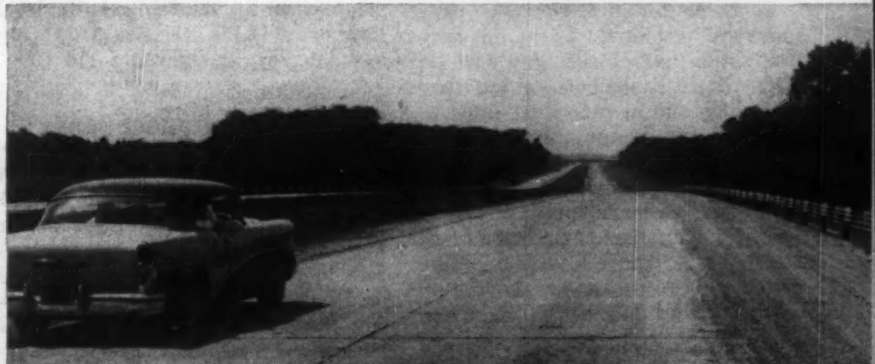
Connecticut's Highway Department has decided to take alternate bids on pavement for the Connecticut Turnpike, the 129-mi toll highway being built between Greenwich on the New York line and Killingly on the Rhode Island border. As designed originally, this highway was to be paved with portland-cement concrete. Now alternate bids on bituminous concrete are being taken.

As a result of this decision, bids on the Milford section of the turnpike that were to have been opened Sept. 12 were opened Sept. 26. All bidders were required to bid on both types of pavement.

(Continued on page 72)

For Safety, Ohio Turnpike Has:

- **Divided pavement with 56-ft median**
- **No intersections at grade**
- **Twin bridges at intersections**
- **Fencing along entire right-of-way**
- **Easy grades, gentle curves**
- **Paved shoulders inside and outside**



Rebman photo

. . . Ohio Turnpike

Continued from page 71

senger cars and 60 mph for commercial vehicles. Two-way radio will connect police and other turnpike vehicles, toll plazas, maintenance areas and the administration building. Service trucks will patrol the turnpike to aid distressed vehicles.

• **Service plazas**—Food, motor fuel and an opportunity to relax will be offered turnpike patrons at the 16 service plazas. Long accelerating and decelerating lanes will permit drivers to enter or leave the plazas and merge with turnpike traffic with comparative safety. In general, the plaza areas extend 1,200 ft along the turnpike and to a depth of 600 ft.

Each area will have a large building to house both the restaurant and gasoline service station. There also will be a small playground and garden, and a good sized picnic area. Each pair of service plazas will be served by a common water system and sewage system.

Restaurants will contain a dining room with 150 seating capacity, a coffee shop to serve about 50 and an outside snack bar.

In accordance with the no-monopoly policy of the Ohio Turnpike Commission the turnpike patrons will have a choice of restaurants operated by three restaurateurs, and of five well-known brands of gasoline. Restaurants and gasoline service stations will be open 24 hr per day.

• **Toll revenues**—If the earnings to date of the eastern 22-mi Eastgate Section are any criterion, the completed turnpike should more than pay its way under full operation. An estimated 39,000 vehicles are expected to use the turnpike daily during the next 12 months.

During the first 8 months of this year the Eastgate Section extending from the Ohio-Pennsylvania state line to State Route 18 west of Youngstown —collected $870,000 in tolls. Of this amount, $464,000 came from passenger cars and $406,000 from trucks.

• **Three years abuilding**—Ground was broken on Oct. 27, 1952 slightly less than three years before contract completion date for opening to traffic. In the early stages of construction, a number of skeptics believed that the target completion date of Oct. 1, 1955 could not be met (ENR Feb. 11, 1954, p. 32). But the combined efforts of the turnpike engineers and their general consultants; the 16 firms of contracting engineers who designed and handled the field engineering; 26 prime contractors; 300 subcontractors; an estimated 10,000 construction men; and perhaps the most gigantic assortment of roadbuilding equipment ever assembled—all resulted in construction being kept sufficiently on schedule to hit the target opening date of Oct. 1, 1955.

. . . Connecticut Bids

Continued from page 71

• **Types of pavement**—The Milford section of the Connecticut Turnpike is about three miles long and will have three lanes of pavement in each direction. Specifications for the portland-cement concrete pavement call for a 10-in. thickness on the outer lane in each direction, which will carry most of the truck traffic, and a 9-in. thickness on the other two lanes.

Subbases for the concrete pavement are as follows: 12 in. in earth cuts, 24 in. in rock cuts, and 6 in. on fills. On embankments of less than 10 ft high and in cuts, there must be 6 in. of free-draining, frost-resistant material below the subbase.

A uniform thickness of bituminous surfacing has been specified for all lanes. It is to be made up of a surface course of 3½ in. of bituminous concrete, a 3-in. course of penetration macadam, and a 4-in. base of broken stone. A subbase 11 in. thick is required in earth cuts and on fills, and 23 in. thick in rock cuts. A 6-in. subgrade of free draining material also must be provided.

Proponents of concrete objected, but unsuccessfully, to the alternate bid plan on the grounds that the two designs were not comparable with respect to load carrying capacity and were not competitive costwise.

Engineers of the Portland Cement Association stated that while the concrete designs to be bid on are suitable for single-axle loadings equal to or greater than the state's maximum legal limit of 22,400 lb—the 9-in. slab being adequate for 30,000lb and the 10-in. slab for 36,000-lb loads—the alternate bituminous section is only equivalent to Asphalt Institute requirements for 18,000-lb maximum axle loads. They also objected to the fact that the concrete design called for concrete curbs and bituminous concrete shoulders whereas penetration macadam shoulders and bituminous lip curbs were permitted for the asphalt alternate.

Highway Commissioner Newman E. Argraves has stated that final decision on the type of pavement to be put down will include more factors than price alone. These will include traffic and road conditions and the frequency of bridges with concrete decks. Where bridges are numerous, portland-cement concrete pavement probably will be laid between them.

Flood Repair Applications

Local governments in New York's flood disaster area have been given until Oct. 15 to apply to the Corps of Engineers for work or reimbursement for temporary repairs to public facilities. The Corps has been authorized to take care of all temporary repairs to public facilities such as bridges, streets and town highways. In addition, it will remove debris and clear stream channels that have been clogged or diverted as a result of the flood.

Flood Damage

North Carolina battered as Hurricane Ione takes heavy toll in six cities

Preliminary estimates of damage caused by Hurricane Ione, the third to hit North Carolina within a month, range up to $100 million, or as much damage as caused there by hurricanes Connie and Diane combined.

Highway damage fortunately was relatively low at $500,000, including roads and bridges as Ione flooded towns and cities, wrecked highways, battered and damaged buildings and tangled communications and utilities systems. The most seriously flooded towns were New Bern, Washington, Belhaven, Beaufort, Morehead City and Elizabeth City.

All the artificial sand barriers thrown up on many beaches after the disastrous Hurricane Hazel in 1954, took terrific poundings during Connie and Diane, but were lost in Ione.

At New Bern, waters from the Trent River swept over 40 square blocks, put business buildings and dwellings under three to four feet of water—loss, $12 million.

At Morehead City, water 5 ft deep broke a 15-ft high seawall.

Acting on a request of Governor Hodges, President Eisenhower declared North Carolina a disaster area for the third time in a month as a result of hurricanes.

Pavements were washed out, subgrades were softened, road shoulders were eroded, the North River bridge on US 70 east of Beaufort was cut as 10 spans went out, and long sections of the highway were left covered by water and sand. Hurricanes Connie, Diane and later heavy rains already have cost Highway Department an estimated $400,000 in repair bills.

Water Supply

Chicago studies 25-year $300-million expansion

A $300-million program to provide an adequate water supply for the Chicago metropolitan area has been submitted to city officials by the engineering firm of Alvord, Burdick and Howson, after a year's intensive study.

The ambitious program would be developed over a 25-year program. The plan contemplates the addition of 85 suburbs to the 51 communities now being supplied Lake Michigan water by Chicago.

Chicago's own water system also would be improved under the plan which recommends a 50% increase in water rates.

Four main transmission lines are recommended: one would run northwest through O'Hare Airfield, extending eventually to Barrington; a second would extend west to Glen Ellyn and Wheaton; a third would run southwest through Hinsdale to Downers Grove; and the fourth would supply Chicago Heights and Park Forest, south of Chicago.

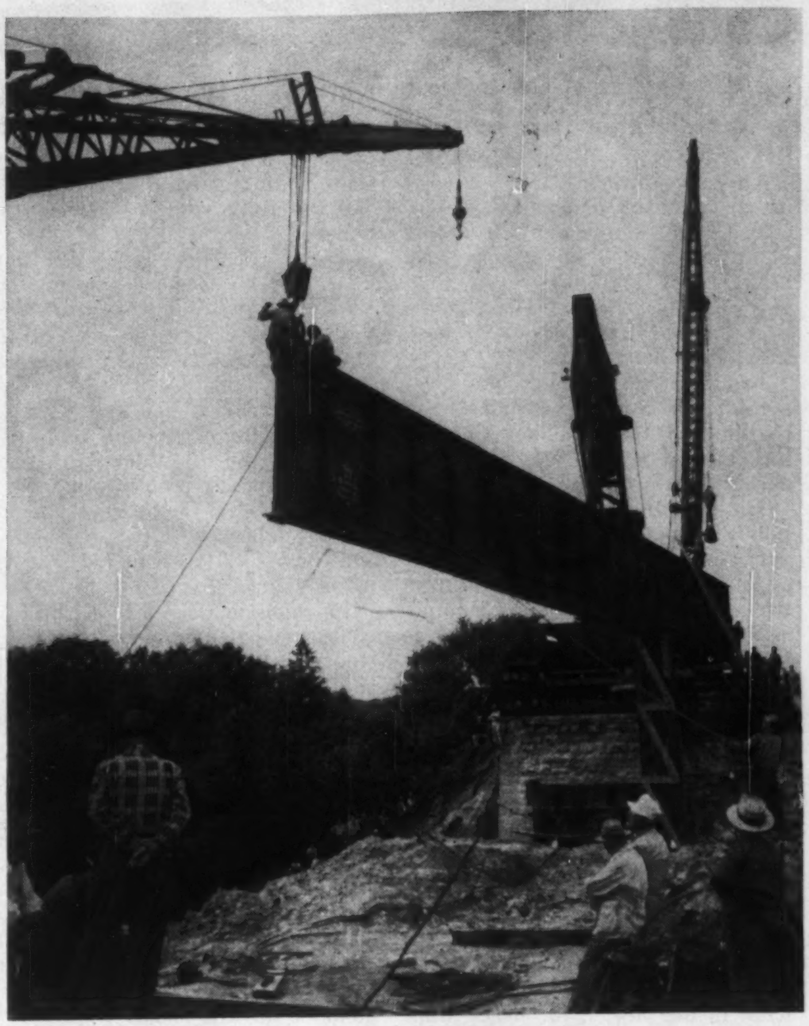
The report was submitted to James W. Jardine, Commissioner of Water and Sewers, for study and examination by city officials.

Court Says State Can Limit Traffic on an Access Road

In a precedent-making decision, the Washington State Supreme Court has ruled that the state has the right to limit the amount of traffic entering a freeway from an access road.

The high court decision overruled Cowlitz County Superior Court at Kelso. Earlier, the county court held that the state had no power to limit the use of lands back of the access since this would bar development of the property to take advantage of increased traffic on the main highway.

Previous court decisions have established that the state can limit access to freeways by designating the points where connecting roads may join the main thoroughfare. These rulings, however, were not concerned with limiting traffic on access roads.



Washed-Out Span Replaced in 8 Days

Within a space of just eight days, two 109-ft girders were fabricated and swung into place to restore a washed-out span on Erie Railroad's main line over Panther Creek at Shohola, Pa. The original 100-year-old stone arch disappeared late in August when Hurricane Diane's floods swept a wall of water down the Delaware gorge. American Bridge engineers, who were at the scene right after the disaster, decided that the old footings would serve to support a modern steel bridge. They drew up replacement plans, then sent verbal orders and specifications to U. S. Steel's Ambridge Plant. The fabrication of 50-ton girders normally would take months. But the plant got them off in record time to the site, where it took just 4½ hours to place them on existing "tee" abutments that had originally been built in 1878.

$92-Million Expressway Loop Approved for Memphis Area

A $92-million expressway plan for Memphis and Shelby County has been approved by the Memphis City Commission.

The project would run north-south and east-west, across Memphis, and loop around the present city limits. The proposed routes were recommended by Harland Bartholomew & Associates, St. Louis planning firm, as a result of a study started last January.

The plan is designed to tie into the proposed federal interstate highway system, which would allot 68 mi of limited-access routes to the Memphis urban area.

Actual start of construction depends on adoption of the national highway plan by Congress and upon appropriation of funds. But the Tennessee Highway Department already has agreed to survey the proposed loop expressway, and federal-state money is available for purchasing right-of-way upon approval by the Federal Bureau of Public Roads.

Housing Project Contract

The $12.5-million general construction contract for erecting Morningside Gardens—a 1,000-family cooperative housing development for middle income groups in New York City—has been awarded to Joseph P. Blitz, Inc., New York general contractor.

The project is sponsored by nine religious, educational and medical institutions.

College Degree in Contracting

Committee of California builders spent two years planning construction management course now offered at UCLA

This fall—for the first time—a major in construction management is included in the curriculum of a leading U. S. university. The course, now under way at the University of California at Los Angeles, leads to a Bachelor of Science degree in business administration.

Inauguration of the new curriculum is the result of two years of planning on the part of the Building Contractors Association of California, in cooperation with the university.

For 10 years the National Association of Home Builders has had a policy of encouraging universities to establish training courses for prospective contractors. But the California association, largest NAHB affiliate, is the first member-group to launch a major, organized offensive in this direction.

The BCA began work on the program early in 1953 by forming an educational committee to work out the details and problems involved in proposing a construction management course. Because UCLA is located in the heart of one of the most rapidly-developing construction areas in the U. S., it was chosen as the place to start the program.

Once UCLA showed an active interest in the project, the major problem to be tackled was development of a course outline. In order to present the university with a clear picture of what was needed, the contractors first had to clarify among themselves what constituted an ideal contractor and what qualifications were most lacking in those entering the field.

• **Too many specialists**—They found that the chief weakness in the education background of most contractors is over-specialization. Because universities have not offered specific training for construction management, students interested in that goal are forced to take a major in architecture, engineering or real estate.

The most heated controversy arose over whether to use the engineering department as the core of the training—thus emphasizing the technical aspect of construction—or to draw chiefly on resources of the business administration department. The BCA committee decided that the contractor of today is essentially a businessman who needs just enough technical knowledge of building to deal intelligently with architects, subcontractors, and specialized technicians in the trade.

The curriculum, as worked out, includes general liberal arts subjects taken during the first two years. But the main emphasis is placed on basic business courses such as finance, accounting, selling, production methods and management problems; law, as it pertains to contracting problems; real estate courses dealing with such topics as housing problems, industrial location and regional development; and the influence of the government and private institutions on use of urban land.

In addition, an art department course in design is given to aid the student in dealing with the architect, and to help him understand the function of design in community planning as well as its effect on sales.

• **Study costs**—Engineering courses include basic structural engineering, surveying and the use of construction materials. In addition, two new courses have been added this fall for the benefit of construction management majors. They deal with construction procedures and equipment, and construction costs from the viewpoint of the contractor.

The BCA hasn't stopped its educational activities. It now has formed four new subcommittees that will continue to act in behalf of the construction management students.

One of the committees will work closely with UCLA faculty members on curriculum matters. A second will work toward incorporating research into the program. A third will be concerned with raising money from the building industry to set up a UCLA scholarship fund for construction management students. The fourth group will deal primarily with job placement.

Alcoa Building Will Feature New Gold-Mesh Wall Design

A new metal-skin building scheduled to go up in Atlanta to house the sales force of Aluminum Co. of America will feature a gold aluminum-mesh wall design.

The front and rear of the two-story building will be overlayed with a gold aluminum mesh set against a blue background of aluminum curtain wall facing. The mesh, a weave of extruded aluminum bars and channels will be composed of removable sections, suspended several inches from the structure's metal skin.

One end of the structure is to be partially faced with a marble pattern, while the other will be blue aluminum. The colors are applied by an electrochemical process in which they are actually impregnated into the surface of the metal. The colors reportedly will not chip, blister or rust.

The 102x61-ft sales center will provide 25 offices, two conference rooms and a number of accessory rooms for Alcoa's 75 district personnel. Both floors will employ central corridors, with windows providing outside lighting in all offices. The natural-finish aluminum windows, enclosed in mechanically operated frames, will pivot vertically for cleaning from the inside.

Architects for the Alcoa project are Schell, Deeter & Scott, Pittsburgh. General contractor is George A. Fuller Co., Atlanta, associated with Van Winkle & Co., also of Atlanta.

Two More Contracts Awarded For Lincoln Tunnel Project

Nearly three miles of continuous fluorescent lighting will be installed in the Lincoln Tunnel's third tube, now being built under the Hudson River, linking New York and New Jersey.

Contracts totaling some $2.3 million have been awarded by the Port of New York Authority for purchase and installation of the electrical equipment. These went to the joint venture of Lighting Electric Service Co., Newark, and Fischbach & Moore, Inc., New York City.

The contracts—the 40th and 41st for third-tube construction—bring to $62 million the total amount awarded since work began in September, 1952. When completed in 1957 the two-lane tube will increase the tunnel's annual capacity by 50%.

Atkinson Sues for $342,000 For Extra Work on Dam Job

Guy F. Atkinson Co. has filed suit against Santa Clara Valley, Calif., Water Conservation District for extra payments the company claims are due on the Lexington Dam project.

Atkinson was prime contractor on the project, located on Los Gatos Creek on the San Francisco peninsula.

Since the job was completed in 1952, the district has paid $1.7 million, the bid amount. But the construction firm asserts that the district owes some $342,000 more because of extra work done. The extra work, according to Atkinson, was necessary because plans were changed during construction, and because the district did not fulfill certain obligations.

Defense Project

Navy plans to construct three piers at Norfolk for use of aircraft carriers

With an eye on rapid construction schedules for its giant Forrestal Class aircraft carriers, the Navy is proceeding with planning for the first of the huge new piers at its Norfolk, Va., operating base.

Congress has authorized $9.8 million for the first of three piers planned. The Navy will ask additional funds for a total of about $28 million for the three structures planned.

Present plans call for piers about 1,300 ft long by 150 ft wide—dimensions that would put the structures among the world's largest of their type. (For comparison, New York City's Piers 88 and 90 which handle the superliners "Queen Mary," "United States" and others—are 1,100 ft long and 125 ft wide. Longest existing piers at Norfolk are 1,100 ft long, 80 ft wide.)

Design for the first pier has been divided into two parts: the pier itself and its shore facilities, by the New York City consulting firm of Praeger-Cavanaugh; designs for bulkhead, breakwater and necessary dredging will be handled by the design division of the Fifth Naval District Public Works Office at Norfolk.

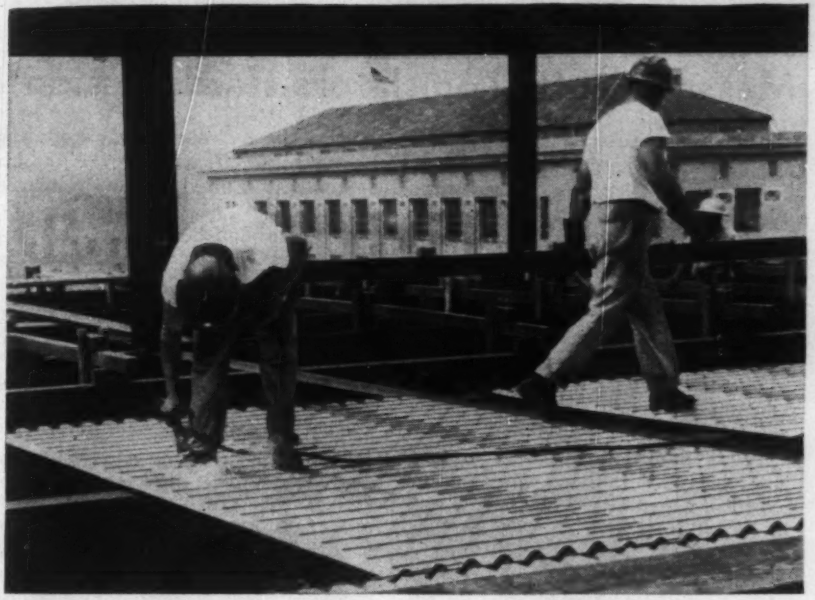
Although no actual design is as yet under way, pending necessary studies, sources at Norfolk indicated that the structures may stand on concrete piles. The deck will carry railroad tracks and steam, fresh water, fuel, electric and telephone lines. At the landward end, the piers will be coupled with an asphalt taxi strip so carrier-based planes can be brought up to the ships under their own power for loading.

As a preliminary to pier construction, the Navy has started work on reclamation of 102 acres of land, with fill being supplied by dredges deepening channels in the Navy Yard area to a 45 ft average depth.

The structures will be protected by a 1,500 ft breakwater, and a long bulkhead will be installed to protect the reclaimed area.

Although the piers have already been popularly christened "Forrestal Piers," Navy sources emphasized that, while the structures were occasioned in part by the construction of the super-carriers, they will also meet a need for additional alongside mooring space for smaller capital ships.

Design and construction is under general direction of the Bureau of Yards and Docks, and under direct supervision of the Department of Public Works at the Naval Base, Norfolk.



Office-Garage Building Goes Up in a Jiffy

A spark of the arc and sheet-steel formwork and floor reinforcing are in place for the Parkade Building at Camden, N. J.

The 5-story office building which will provide parking space on its third, fourth and fifth floors, is being erected at an unusually rapid pace:

1. Excavation for the 150 x 500-ft structure, known as the Parkade Building, took only 29 days; 67,000 cu yd of earth were involved.

2. Steel erection of 3,500 tons was completed in 26 days by Bethlehem Steel Co., using high-tensile-strength bolts.

3. Up to 30,000 sq ft per day of corrugated-steel-sheet decking are being placed by 12 men for Fireproof Products Co., Inc., another subcontractor. The 13 x 12½-ft panels are both forms and reinforcing for the 4½-in.-thick concrete floors. The panels arrive at the site complete with temperature steel and are spot welded into place. Only negative steel over supports and electrical conduit are added before placing concrete.

Bill Harris is the superintendent for Terminal Construction Co., the general contractor. Architects for the combined office, store and elevated parking facility are Ziegler, Childs & Paulson, and the consulting engineer is Lars I. Moe & Son. Architect and engineer are Jersey City, N. J. firms. Dan LaMorte is superintendent for Fireproof Products Co., Inc.

Cowlitz Dams Controversy Reaches State Legislature

Washington's State Legislative Council has been asked to investigate spending of public funds by the State Fish and Game Departments in opposing construction of Tacoma's $134-million hydroelectric project on the Cowlitz River.

The departments have been seeking an injunction against the project on the grounds that a state law preserves the stream as a sanctuary (ENR Sept. 15, p. 23).

Tacoma's representatives in the state legislature have requested the investigation, contending that the two departments are wasting public funds. The city's utility director charges that the departments paid $75,000 plus expense-money—for the services of three assistant state attorney generals to argue just one phase of the legal maneuvering that has delayed the project in the courts. He estimates, in addition, that they spent approximately $20,000 in opposing the project before the Federal Power Commission.

Project plans call for one dam to be built at Mayfield, the other at Mossyrock. Tacoma already has awarded a contract for the Mayfield work, but actual construction is being held up by a restraining court-order granted the two departments.

Ohio River Under Discussion

The Ohio Valley Improvement Association will round out 60 years of Ohio River development at its annual meeting in Cincinnati Oct. 3 and 4. Three of the organization's standard topics—navigation locks and dams, flood control and conservation of water—will again come up for discussion. Two new subjects have been added: The Threat of Tolls on Inland Waterways, and War and Peacetime Uses of Atomic Energy.

Municipal Issues and Road Plans Give Massachusetts Legislators Hard Session

The Massachusetts legislature finally has ended its 1955 session, after prolonged bickering over Boston municipal problems and proposed new highway expenditures. However, the delayed adjournment enabled it to take prompt action on measures to finance reconstruction of public facilities damaged by the late August floods.

Gov. Christian A. Herter's proposed $125-million highway bond issue was killed by the Senate after it won House approval. Passage would have meant a record state budget of $550 million. As it is, the authorized $425 million worth of expenditures falls below that of the all-time high of $531 million, set in 1952.

Considerable debate centered on plans for two highly publicized Boston projects—the $75-million Back Bay business center (ENR Feb. 3, p. 28) and the $8.5-million garage beneath Boston Common (ENR April 21, p. 28).

The lawmakers set aside certain easements to permit construction of a tunnel from Boston Common to Commonwealth Ave. for access to the proposed underground garage. However, they sidetracked a measure to set up a seven-member public authority to build and operate the 2,400-car facility. Settlement of litigation on the parking project, expected shortly, will end eight years of ups and downs.

Tax deferment privileges on the proposed Back Bay Center were thrown out, thus holding up the gigantic undertaking and perhaps ruling it out altogether. Proposals for tax concessions were calculated to win financial support for the project, which would go up over the 28-acre yards of the Boston & Albany Railroad. Construction involves a $5-million convention and exhibition hall, a shopping center, a hotel, several office buildings, plus underground parking space for 5,000 cars.

Construction got a big boost from passage of a new building law designed to do away with some archaic restrictions. The code addition will permit use of state-approved new materials to reduce costs. A second bill sets up a new State Board of Schoolhouse Construction Standards in the Department of Public Safety to search for other means of shrinking building costs.

These are some of the other highlights of the state's legislative session:

- **Flood relief**—A $25-million bond issue was passed to finance state and local road and bridge repairs. A second issue—for $30 million—was authorized to pay for other repair work and to reimburse cities and towns for tax abatements granted on flood-damaged properties.

A $10-million bond issue was voted for a Metropolitan District Commission flood-control project and drainage in the Boston suburbs of Wakefield, Melrose, Stoneham, Everett and Revere. In addition, a flood control and land reclamation program along the Neponset River in Greater Boston was authorized with a $2-million bond issue.

- **Highways**—The Massachusetts Turnpike Authority has been authorized to extend the 123-mi east-west toll road into Boston. Its eastern terminus previously had been set near Boston at Route 128 in Weston.

- **Parking**—Boston was authorized to borrow another $10 million for off-street parking facilities. Several other cities—including Worcester and Springfield—also got the green light to borrow for this purpose.

- **Sewerage**—A $1-million bond issue was granted for extension of Boston's south metropolitan sewerage system to Framingham and Natick.

- **Tax relief**—Authority for cities and towns to borrow from the state against tax titles for ordinary maintenance and other purposes has been extended to July 1, 1957. This year Boston borrowed $3.5 million under this measure in order to hold down its 1955 tax rate.

- **Institutions**—Boston has been permitted to borrow $3 million for repairs to hospitals.

A $30.9-million bond issue was voted to finance construction at state teachers colleges and the University of Massachusetts, as well as at correctional, mental and public health units.

- **Recreation**—Expansion of recreational facilities was pushed by passage of a $2.6-million bond issue for state purchase and development of Horsneck Beach in Westport; a $750,000 issue for development of Scusset Beach at the mouth of Cape Cod Canal; and a $1.5-milion issue for development at Lake Quinsigamond in Worcester.

Jacksonville vs Turnpike Route Report

Engineers' recommendations that the proposed state-long Florida Turnpike by-pass Jacksonville at its northern terminus have raised a storm of protest from local interests.

The highways committee of Jacksonville's Chamber of Commerce and South Side Business Men's Club has suggested that the $200-million turnpike tie into U. S. Highway 1 at a point about 12 mi south of the city.

The northern end of the route, as finally recommended by Howard, Needles, Tammen & Bergendoff, New York City consulting engineers, would lie about 6½ mi west of Jacksonville, and furnish feeder lines into the city. Originally, the route was slated to run 16 mi to the west of Jacksonville, but it was brought in 10 mi as a result of protests (ENR March 10, p. 23).

The conflict between engineering recommendations and local interests has raised a question. Would the prime objective of the toll road—to get people where they are going in the quickest possible time—be thwarted if traffic were funneled through the city instead of avoiding it?

At the turnpike's southern end, where work is now in progress between Ft. Pierce and Dade County, the route will take traffic into the Miami area. But there the primary purpose is to get tourists to south Florida as quickly as possible. Oddly enough, when the original route of the southern end was laid out too close to West Palm Beach, local interests protested that it would choke off western expansion.

The protests of Jacksonville interests against the by-pass route have been laid before Gov. Leroy Collins. He has stated that he is in strong sympathy with efforts to protect and improve investments in Florida. But he adds that the state is heading for trouble if any consideration other than sound engineering advice determines the location. "There is even some danger that locating the northern terminus of the turnpike south of Jacksonville would overload the expressway system from the moment of its completion. Thus no real progress would be made in solving Florida's overall highway problems."

Special Safety Session

Michigan's Gov. G. Mennen Williams has announced plans to call a special session of the state legislature to consider the problem of highway safety.

The session, which is expected to be held late in October or early in November, will consider a safety program designed to reduce the state's increasing highway death toll.

On Second Thought . . .

New York May Scrap Passenger Belt Plan

New York City's long-discussed plan to substitute a passenger belt-conveyor for the 37-year-old shuttle train between Times Square and Grand Central Station appears doomed.

Transit Authority heads now are questioning whether the mechanism is economically sound or necessary at this time. They believe that the existing shuttle—opened in 1918—is rendering good service and could be improved for considerably less than the $4.1 million it would cost to put in the belt.

In addition, the City Comptroller terms the project an expensive experiment involving high maintenance charges. And his engineering staff reportedly raised the question of safety during its investigation of the belt system.

The Board of Estimate will defer action on the project until its regular meeting, scheduled for Oct. 20. At that time the proposal will be restudied in regard to operations and costs. Meanwhile, transit officials are considering a new plan to extend and improve the present Times Square platform. This plan would include elimination of curves and possible extension of the track beyond Grand Central.

The moving-belt scheme was inherited by the new Transit Authority when it took over from the old five-man board last July. As planned, the shuttle conveyor would consist of an endless chain of 10-passenger cars resting on moving rubber belts. (ENR June 3, 1954, p. 26). The cars would move along the platform at 1½ mph to permit passengers to step on and off. The cars would speed up to 15 mph after leaving the station, then slow down again upon arrival at the other terminus.

The conveyor was first proposed as a shuttle replacement in 1952 by the old Board of Transportation. The Board of Estimate was asked for $3.8 million to build and install a moving platform to carry 15,000 passengers an hour. That sum was included in the capital budgets for 1953 and 1954, but the plan also called for an additional $1.1 million to reconstruct the shuttle tunnel.

Last November the old authority awarded a $3.8-million contract for furnishing and installing the equipment to Passenger Belt Conveyors, Inc., of Akron, Ohio, a subsidiary of Stephens-Adamson Manufacturing Co., Aurora, Ill., (ENR Nov. 11, 1954, p. 27). This agreement, however, never received the required approval of the Board of Estimate.

The Old Third Avenue El Bows Out

After 70 years of service, New York's Third Avenue El is being demolished as part of a city modernization program. The structure, which will yield 35,000 tons of scrap steel, is being cut down and shipped 90 mi by barge and rail to the Bethlehem, Pa., plant of Bethlehem Steel Co. Lipsett, Inc., New York City contractors, is expected to take nearly a year to complete the demolition job.

Florida Airbase Expansion

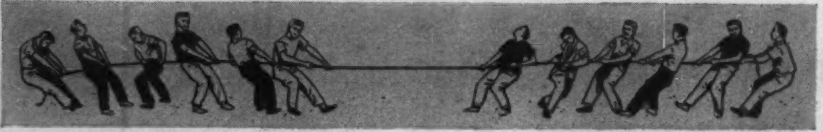
Cecil Field Naval Air Station, southwest of Jacksonville, Fla., is slated for a $12-million expansion program followed by an additional $10-million program during fiscal year 1957.

Among the improvements will be a new 8,000-ft runway, a theater, the first unit of bachelors' quarters and 90 housing units. Also included will be a Miramar-type hangar, high-speed fueling facilities, a parachute loft, recreation fields and new supply warehouses.

Goal: Four Cumberland Dams

An all-out fight for construction of four dams on the Upper Cumberland River has been pledged by a newly-formed group of business leaders from six Upper Cumberland counties. The organization—Upper Cumberland Development Association—has as its goal construction of one power and flood control dam on Laurel River, one on Rockcastle River, and two on Big South Fork River just over the Kentucky line in Tennessee.

Col. Gilbert M. Dorland, Nashville District Engineers, had estimated that the total cost of the four projects would exceed $100 million.

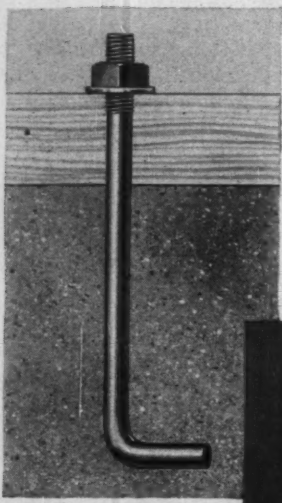


ANCHOR "MEN"

OF THE *Lamson* LINE...

Because every fastener is designed to do a specific holding job, it takes a rugged fastener when the going's rough.

Here are the "brutes" of the Lamson Line, backed by 89 years of experience and proven in use under the most rugged conditions.



LAMSON ANCHOR BOLTS

For fastening wood to concrete. Made from mild carbon steel with a right angle bend which acts as an "anchor hook".

These anchor bolts are now required in many building codes and are made to meet such specifications.

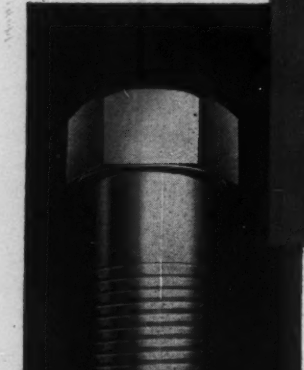
There is a 2" hook at one end and a 2" thread at the other. Sizes range from 6 to 20 inches in length and in two diameters—⅜" and ½". Furnished with washer and square nut.

BULLDOG WIRE ROPE CLIPS

Made with U-Bolts of high quality steel, accurately threaded for close fit with forged hexagon nuts.

The secret of their non-slip grip is in the construction of the saddle (Certified Malleable Iron of Approved Quality) . . . the wire rope lays smoothly in tailor made grooves that grip in the center and don't cut or bite at the edges.

The entire assembly is plated to withstand a 40 hr. salt spray test. The Lamson Wire Rope Clip comes in a wide range of sizes (3/16" to 1½" clips) . . . one for most every holding job.



LAMSON 1035 CAP SCREWS

The real "workhorse" of the construction and heavy equipment field. Available in sizes from 3/16" x ½" to 1½" x 12" and fine or coarse threads. After years in the field, Lamson 1035, High Carbon, Heat Treated Cap Screws are proving to be one of the most versatile fasteners available.

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1971 West 85th Street • Cleveland 2, Ohio
Plants at Cleveland and Kent, Ohio
Birmingham • Chicago

Large Bolts • Cotters
Square and Hex Nuts • Weather-tight Bolts • Bent Bolts
Phillips and Clutch Head Screws • Lock Nuts • Cap Screws

Pennsylvania Hikes Taxes To Repair Flood Damages

Pennsylvania's Gov. George M. Leader has signed bills calling for a one-cent increase in gasoline and cigarette taxes to finance flood-damage reconstruction.

The added gasoline tax, which became effective Sept. 13 for two years, is expected to bring in $54 million. The new cigarette levy, scheduled to start Oct. 1 for 20 months, will provide an estimated $20 million.

The 6-cent gas tax will give the Pennsylvania Highways Department $30 million for repairs to state highways and bridges. Local governments will get $15 million for road and bridge reconstruction. The remaining $9 million is slated for other local subdivisions for increased state highway aid.

The 5-cent cigarette tax will give the state Civil Defense Council $12 million for distribution to state departments. The rest will go into a permanent state disaster fund. The bulk of the $12 million will go to the Forests and Waters Department, with $3 million slated for repairs to flood-damaged channels and $7 million for new flood control projects.

North Carolina to Finance Surveys for 2 New Bridges

North Carolina has allocated $40,000 to finance engineering surveys for two new bridges—one across the Cape Fear River at Wilmington, the other across the Alligator River on the northeast coast.

The Wilmington bridge, which is the largest new project currently under consideration for the highway system, would cost at least $12 million (ENR, Sept. 15, p. 27). It would connect U. S. Highways 17 and 74 in Brunswick County with Dawson St. in Wilmington. Present plans call for a 5,500-ft-long span with a 600-ft horizontal and a 155-ft vertical navigation clearance.

The Alligator River bridge, to cost about $3 million, would carry U. S. Highway 64 from the Sandy Point area in Tyrrell County to the East Lake section in Dare County.

Norfolk Hails Progress In Fight Against Slums

Norfolk's Board of Minimum Housing Standards—formed in 1951 to prevent slums from developing—has cited a high rate of cooperation from property owners in compliance with the city's code of minimum standards.

The board, which has just issued its first report, announces that from

January, 1954, to August, 1955, 804 dwelling units were rehabilitated; approximately 702 units were in various stages of repair as a result of notices; and 35 full blocks had been surveyed and 17 blocks rehabilitated.

Enforcement of the code is under the direction of the Norfolk Department of Public Health. The board exists as an appeals body, and during the year and a half of its full operation has had to sit in that capacity only once.

Kaiser Pursues Approval To Build Dam in Canada

Despite Canadian legislative barriers, Kaiser Aluminum & Chemical Corp. still wants to go ahead with plans to build a $25-million Arrow Lake storage dam on the Columbia River in British Columbia (ENR Oct. 14, 1954, p. 24).

One of the firm's first steps will be to file an application with the Canadian federal government for a permit to export water to feed its generators in Bonneville, Wash. Under the international rivers bill passed in the House of Commons earlier this year, such a permit must be obtained before water resources may be exported.

British Columbia, which endorses the project, was overruled by the federal government on this issue. If the Kaiser permit is not granted, British Columbia may challenge the federal government's right to interfere in what the provincial government maintains is a local affair. Meanwhile, the province has gone ahead and approved an eight-month extension for Kaiser to complete surveys.

Two New Edmonton Bridges —Answer to Traffic Jams

Construction of a new four-lane bridge has been approved by Edmonton, Alberta, as the answer to traffic jams across the North Saskatchewan River.

The long-discussed project, to be located upstream from the present 105th St. bridge crossing, is expected to cost approximately $3.3 million. Edmonton's next step will be to pass a law enabling it to borrow the necessary money. This measure then will be submitted for approval to the Alberta Public Utility Commission and placed before city voters.

A second new bridge across the North Saskatchewan is scheduled as part of an Alberta plan to build ring roads around Edmonton. The provincial program, expected to get under way next year, calls for construction of a crossing in the vicinity of 142nd St.

In Hazardous or Coded Areas Specify RESOLITE FIRE-SNUF The Fiberglass Panels With Flame Spread Rating Below 75*

In buildings where fire hazards are severe or where codes require a flame spread rating below 75, you can now specify Resolite Fire-Snuf fiberglass-reinforced, translucent panels for plant daylighting.

Fire-Snuf panels are self-extinguishing—they will not, of their own accord, support combustion. Under the fire of a blow-torch (see below) they will burn, but they extinguish themselves almost immediately upon removal of the source of heat and flame. *Their flame spread rating of below 75 places them in a bracket equivalent to the Building Officials Conference of America classification of "slow burning" or "flame retardant."

FIRE-SNUF

Blow-Torch Test

A blow-torch applied directly to edge of a Fire-Snuf panel slowly ignites resin and small flames appear. The blow-torch is turned aside and five seconds later (note stop watch) flames on the panel are self extinguished.

Fire-Snuf panels are not designed to replace standard Resolite, but, rather, to supplement it in critical areas. With permanent flame resistance chemically locked in, they retain all the best features of standard Resolite—shatterproof safety, strength, translucence, stability and load bearing characteristics.

Available at extra cost, Fire-Snuf is molded in flat panes for glazing and in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches. For additional information consult your distributor or contact . . .

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Office and Warehouse, CHICAGO, ILL.
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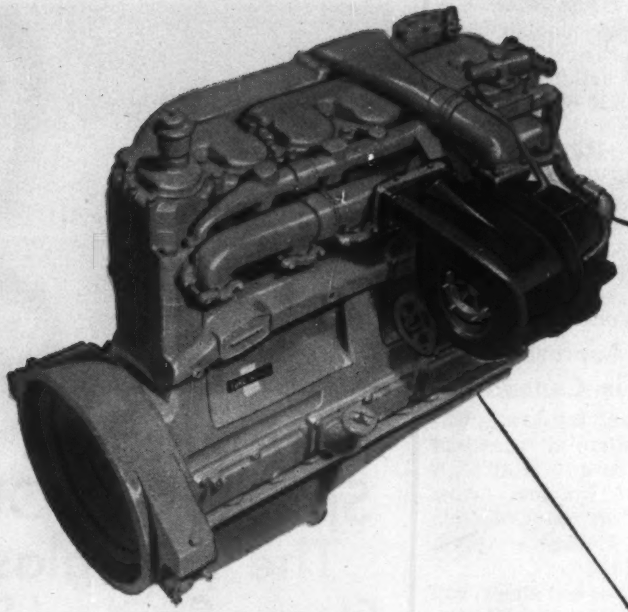
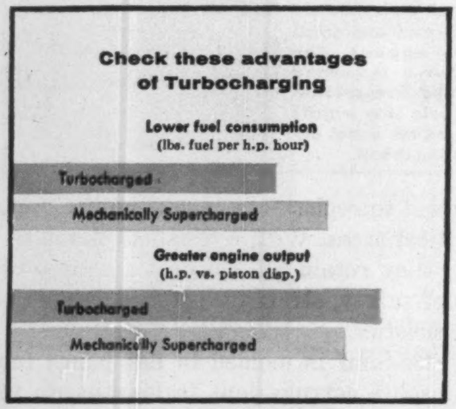


Cummins Turbodiesels.

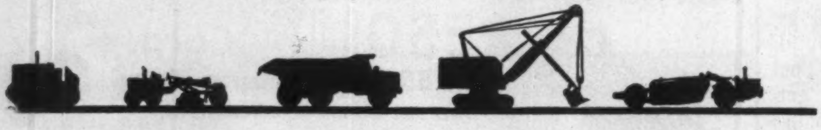


Five new Cummins Turbodiesels (175 . . . 250 . . . 262 . . . 300 . . . . and 600 h.p.) now feature the sensational new development in Diesel engineering—exhaust gas turbocharging!

They give you more economy . . . more performance than naturally aspirated or mechanically supercharged engines. Exhaust gas energy normally wasted is harnessed to achieve a more perfect air-fuel mixture in the combustion chamber, without any parasitic load. (See diagram at right.)

If you want drastically reduced fuel costs . . . longer engine life . . . lowest possible weight per horsepower . . . and maximum profits . . . get full details on Cummins Turbodiesels from your nearest Cummins Distributor.

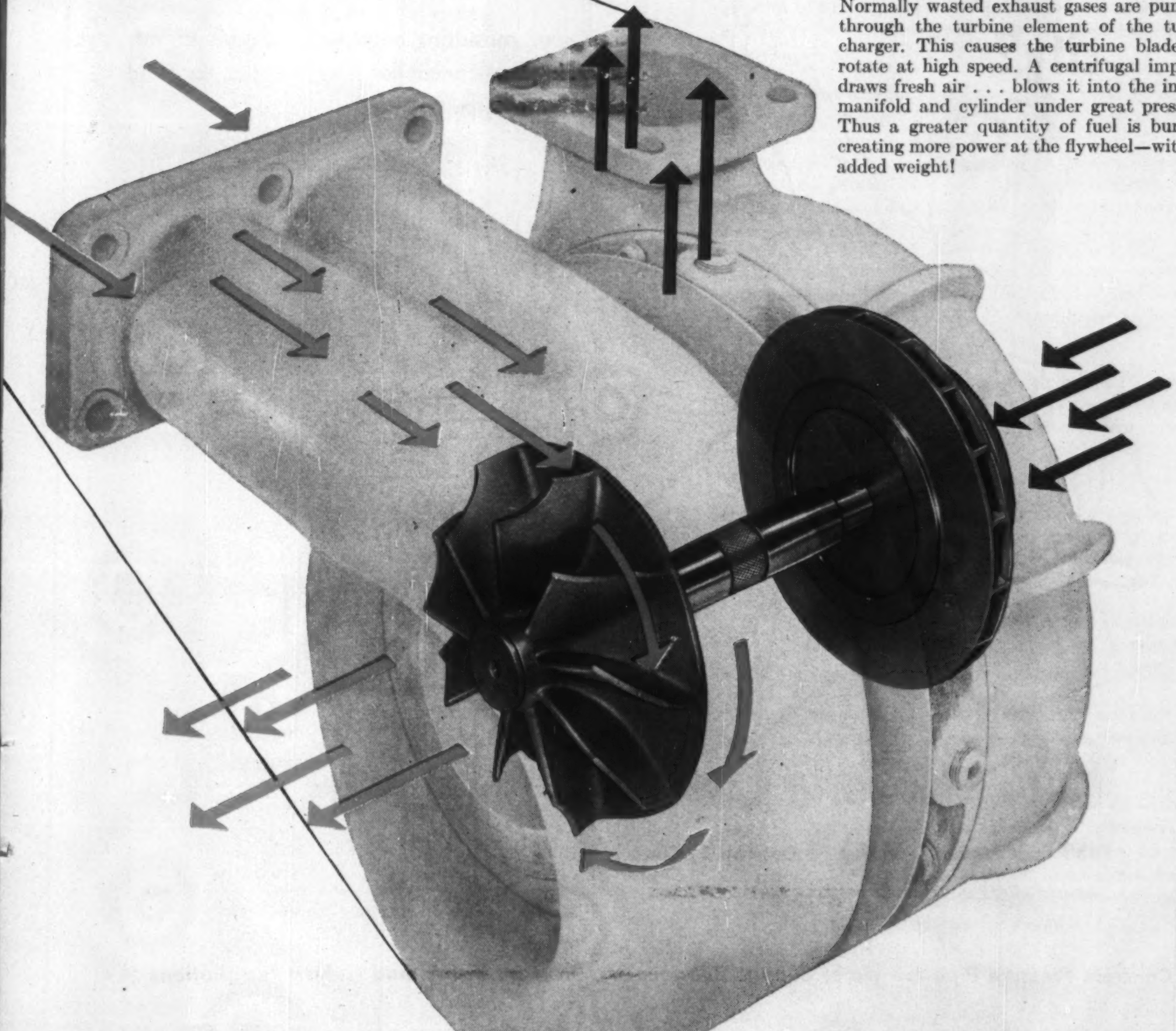
Cummins Diesels are available in the equipment of over 40 leading manufacturers.



CUMMINS

Cummins Engine Company, Inc. • Columbus, Indiana

. . . put waste heat to work!



flow of exhaust gases

⬅ flow of intake air

Cummins Turbocharging — how it works. Normally wasted exhaust gases are pumped through the turbine element of the turbocharger. This causes the turbine blades to rotate at high speed. A centrifugal impeller draws fresh air . . . blows it into the intake manifold and cylinder under great pressure. Thus a greater quantity of fuel is burned, creating more power at the flywheel—with no added weight!

Salem got the "Big 3"

Will your city?

Out here in Ohio, Salem wanted a 20-inch supply line that would *last a 100 years or more,* be *strong enough to be virtually shatter-proof,* and give them *sustained high carrying capacity.*

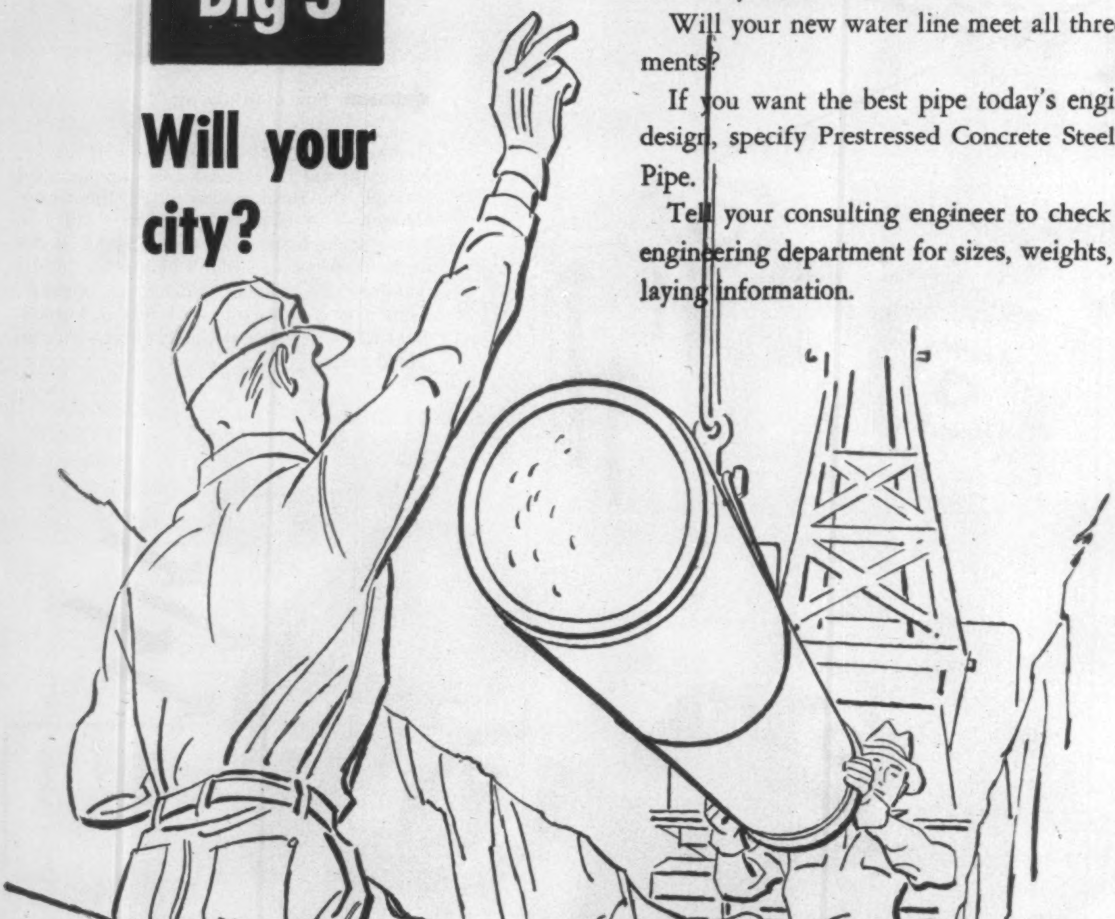
They picked Price Pipe, because it gave them *every one* of the "Big 3": *long life, great strength* and *sustained capacity.*

Rochester, N. Y. picked Price Pipe for the same reasons. So did Dayton, Ohio, Saginaw, Michigan and many more.

Will your new water line meet all three requirements?

If you want the best pipe today's engineers can design, specify Prestressed Concrete Steel-Cylinder Pipe.

Tell your consulting engineer to check with our engineering department for sizes, weights, tests and laying information.

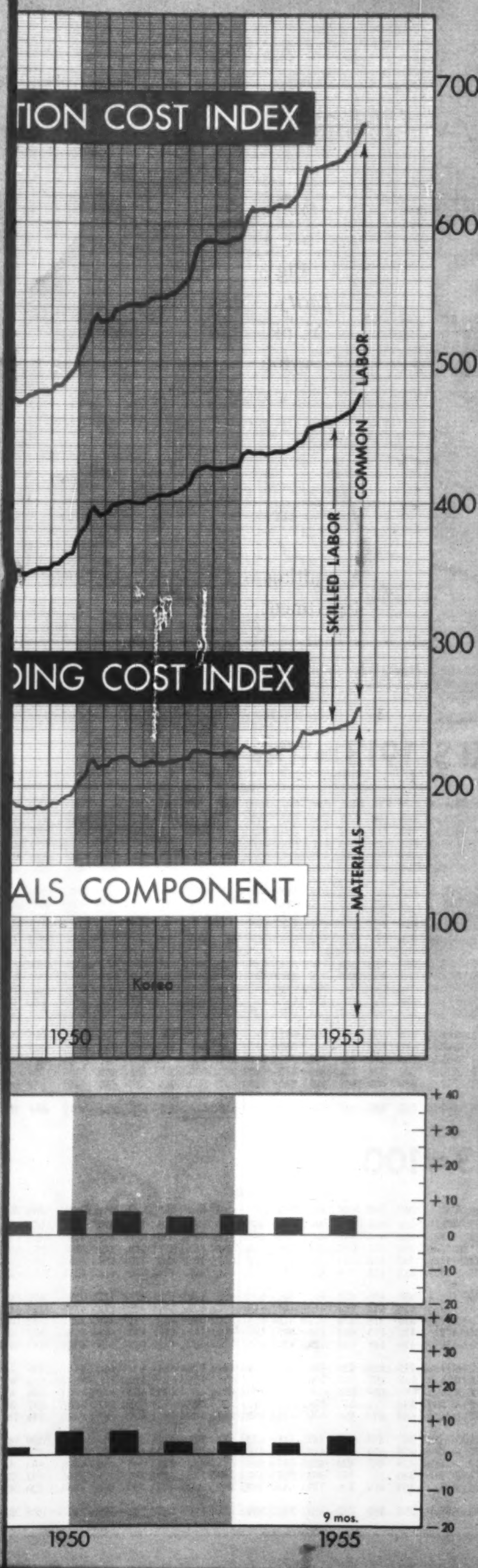


Price Brothers Company

1858 East Monument Ave. • Dayton 1, Ohio

MEMBER AMERICAN CONCRETE PRESSURE PIPE ASSOCIATION

Concrete Pressure Pipe for Water Supply, Subaqueous, Pressure Sewer and Culvert Installations



ENGINEERING NEWS-RECORD CONSTRUCTION AND BUILDING COST INDEXES

THE ENGINEERING NEWS-RECORD Construction Cost Index was established in 1921, based on price movements in structural steel, portland cement, lumber and common labor. The Building Cost Index was introduced in 1938 to measure also the effect of skilled wage trends on costs. It uses the same materials as those in the construction cost index but skilled labor, instead of common labor.

A few minor changes have been made in these indexes over the years necessitated by changed conditions in the market. These are recorded in full in ENR, September 1, 1949, page 398, together with a complete history of the development and use of these indexes. New values originally reported monthly at the beginning of each month have also been reported each week beginning July, 1954.

Both indexes are based on 1913=100 but are reported also each week on 1926=100 and 1949=100 bases. These are weighted aggregative indexes, thus base years can be shifted at will.

ENR Construction and Building Cost Indexes reflect wage rate and material price trends. They do not adjust for labor or job efficiency, materials availability, competitive conditions, management, mechanization or other "intangibles" affecting construction costs.

- **A hypothetical block of construction** requiring 6 bbls of cement, 1.088 M ft bm of lumber, 2,500 lbs of steel and 200 hrs of common labor is used in the **Construction Cost Index** to measure the trend of the cost of heavy construction.
- **A similar hypothetical block of construction** using the same quantities of materials, but 68.38 hrs of skilled labor is the basis for computing the **Building Cost Index.**

This simple structure was adopted to facilitate prompt reporting of changes due to price and wage rate movements, both as to direction and degree.

Both indexes have proved, over the years, infallible as to direction and, in normal times, accurate as to degree. Under abnormal conditions of increasing or decreasing job productivity, allowance for the "intangibles" listed above should be made in measuring the degree of change in overall completion costs, or in construction selling price trends.

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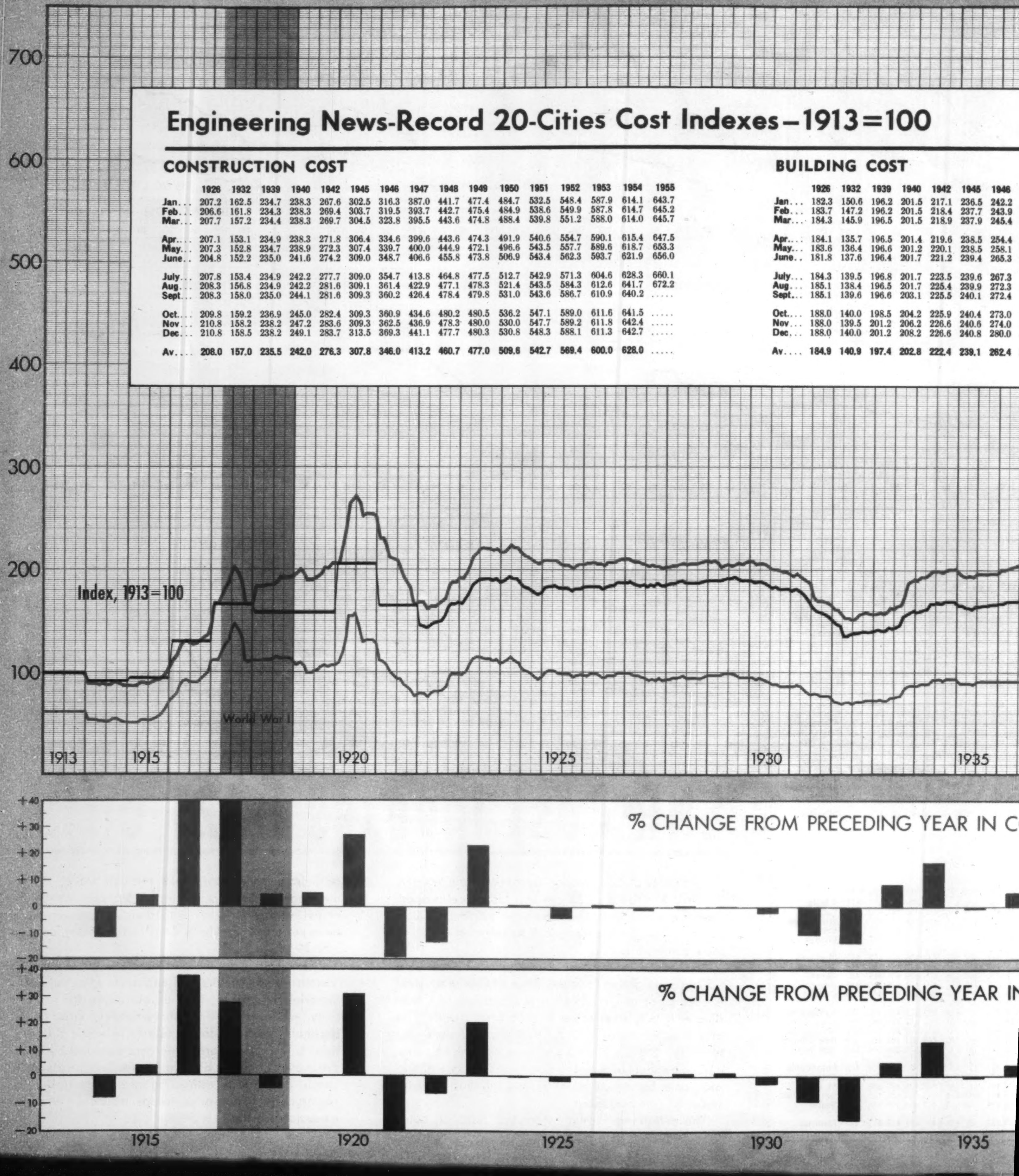


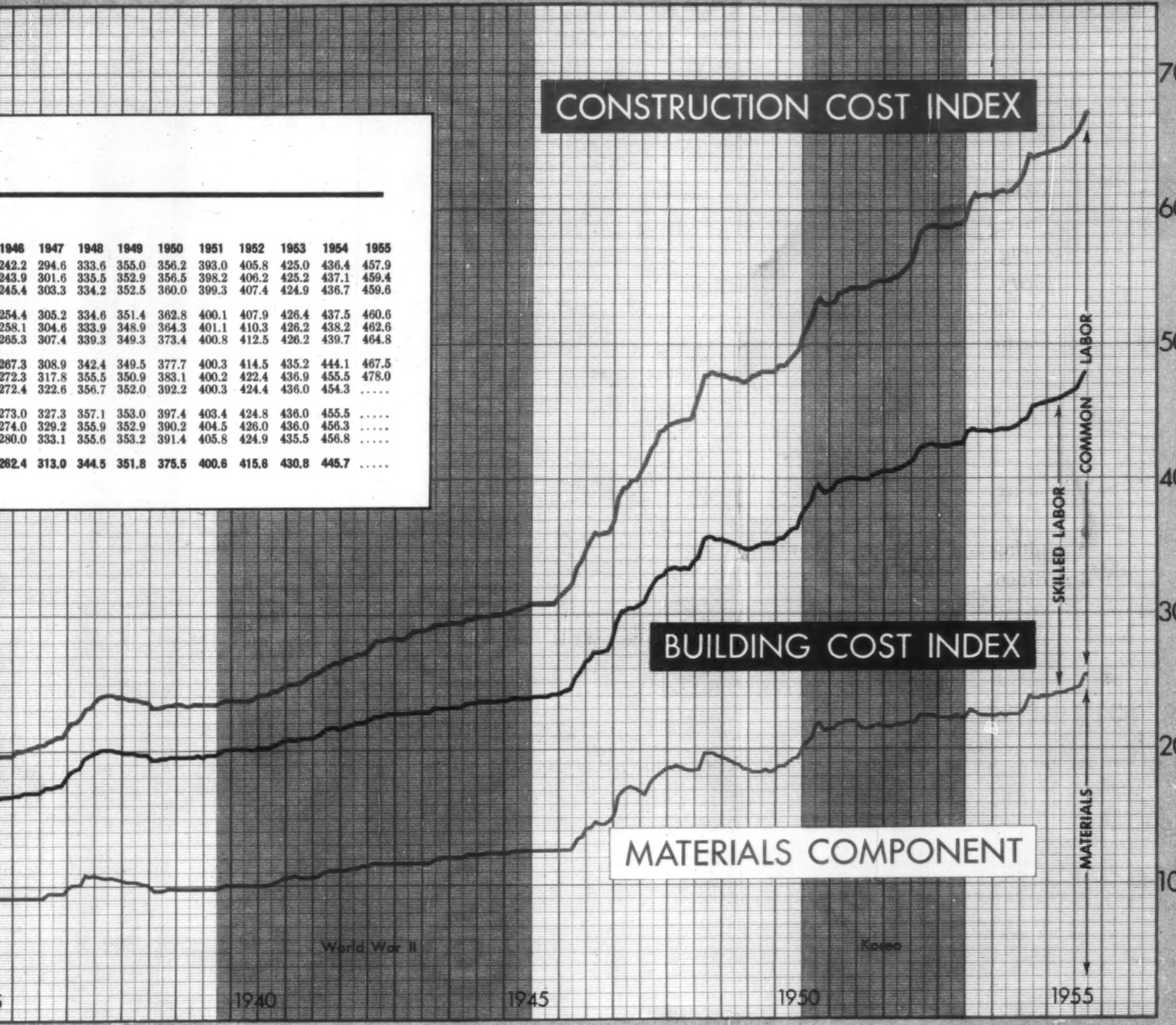
Engineering News-Record 20-Cities Cost Indexes—1913=100

CONSTRUCTION COST

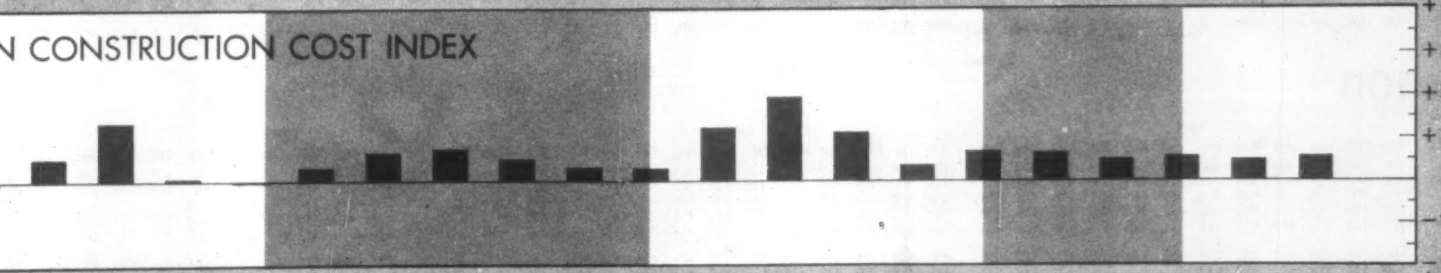
	1926	1932	1939	1940	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan...	207.2	162.5	234.7	238.3	267.6	302.5	316.3	387.0	441.7	477.4	484.7	532.5	548.4	587.9	614.1	643.7
Feb...	206.6	161.8	234.3	238.3	269.4	303.7	319.5	393.7	442.7	475.4	484.9	538.6	549.9	587.8	614.7	645.2
Mar...	207.7	157.2	234.4	238.3	269.7	304.5	323.8	395.5	443.6	474.8	488.4	539.8	551.2	588.0	614.0	645.7
Apr....	207.1	153.1	234.9	238.3	271.8	306.4	334.6	399.6	443.6	474.3	491.9	540.6	554.7	590.1	615.4	647.5
May...	207.3	152.8	234.7	238.9	272.3	307.4	339.7	400.0	444.9	472.1	496.6	543.5	557.7	589.6	618.7	653.3
June..	204.8	152.2	235.0	241.6	274.2	309.0	348.7	406.6	455.8	473.8	506.9	543.4	562.3	593.7	621.9	656.0
July...	207.8	153.4	234.9	242.2	277.7	309.0	354.7	413.8	464.8	477.5	512.7	542.9	571.3	604.6	628.3	660.1
Aug...	208.3	156.8	234.9	242.2	281.6	309.1	361.4	422.9	477.1	478.3	521.4	543.5	584.3	612.6	641.7	672.2
Sept...	208.3	158.0	235.0	244.1	281.6	309.3	360.2	426.4	478.4	479.8	531.0	543.6	586.7	610.9	640.2	.....
Oct....	209.8	159.2	236.9	245.0	282.4	309.3	360.9	434.6	480.2	480.5	536.2	547.1	589.0	611.6	641.5	.....
Nov...	210.8	158.2	238.2	247.2	283.6	309.3	362.5	436.9	478.3	480.0	530.0	547.7	589.2	611.8	642.4	.....
Dec...	210.8	158.5	238.2	249.1	283.7	313.5	369.3	441.1	477.7	480.3	530.8	548.3	588.1	611.3	642.7	.....
Av....	**208.0**	**157.0**	**235.5**	**242.0**	**276.3**	**307.8**	**346.0**	**413.2**	**460.7**	**477.0**	**509.6**	**542.7**	**569.4**	**600.0**	**628.0**	.....

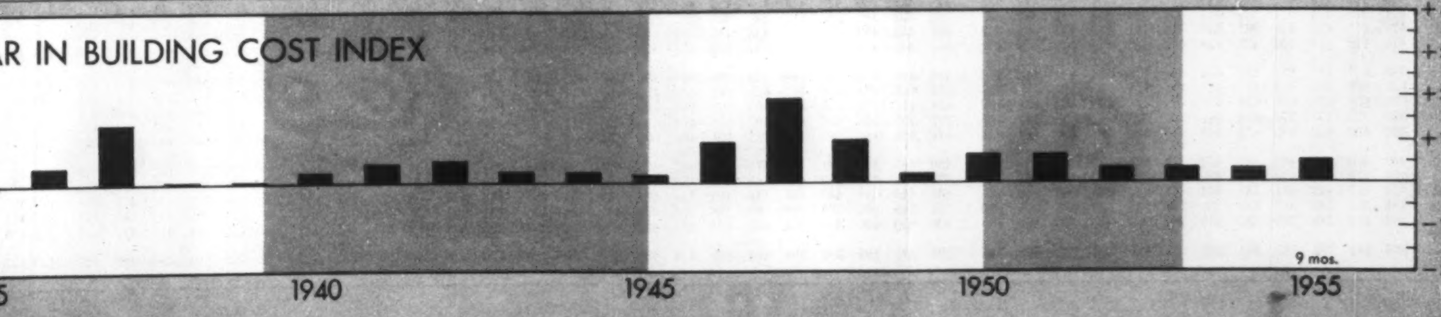
BUILDING COST

	1926	1932	1939	1940	1942	1945	1946
Jan...	182.3	150.6	196.2	201.5	217.1	236.5	242.2
Feb...	183.7	147.2	196.2	201.5	218.4	237.7	243.9
Mar...	184.3	145.9	196.5	201.5	218.9	237.9	245.4
Apr....	184.1	135.7	196.5	201.4	219.6	238.5	254.4
May...	183.6	136.4	196.6	201.2	220.1	238.5	258.1
June..	181.8	137.6	196.4	201.7	221.2	239.4	265.3
July...	184.3	139.5	196.8	201.7	223.5	239.6	267.3
Aug...	185.1	138.4	196.5	201.7	225.4	239.9	272.3
Sept...	185.1	139.6	196.6	203.1	225.5	240.1	272.4
Oct....	188.0	140.0	198.5	204.2	225.9	240.4	273.0
Nov...	188.0	139.5	201.2	206.2	226.6	240.6	274.0
Dec...	188.0	140.0	201.2	208.2	226.6	240.8	280.0
Av....	**184.9**	**140.9**	**197.4**	**202.8**	**222.4**	**239.1**	**262.4**



1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
242.2	294.6	333.6	355.0	356.2	393.0	405.8	425.0	436.4	457.9
243.9	301.6	335.5	352.9	356.5	398.2	406.2	425.2	437.1	459.4
245.4	303.3	334.2	352.5	360.0	399.3	407.4	424.9	436.7	459.6
254.4	305.2	334.6	351.4	362.8	400.1	407.9	426.4	437.5	460.6
258.1	304.6	333.9	348.9	364.3	401.1	410.3	426.2	438.2	462.6
265.3	307.4	339.3	349.3	373.4	400.8	412.5	426.2	439.7	464.8
267.3	308.9	342.4	349.5	377.7	400.3	414.5	435.2	444.1	467.5
272.3	317.8	355.5	350.9	383.1	400.2	422.4	436.9	455.5	478.0
272.4	322.6	356.7	352.0	392.2	400.3	424.4	436.0	454.3	.....
273.0	327.3	357.1	353.0	397.4	403.4	424.8	436.0	455.5	.....
274.0	329.2	355.9	352.9	390.2	404.5	426.0	436.0	456.3	.....
280.0	333.1	355.6	353.2	391.4	405.8	424.9	435.5	456.8	.....
262.4	**313.0**	**344.5**	**351.8**	**375.5**	**400.6**	**415.6**	**430.8**	**445.7**	.....





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News-Record 20-Cities Cost Indexes—1913=100

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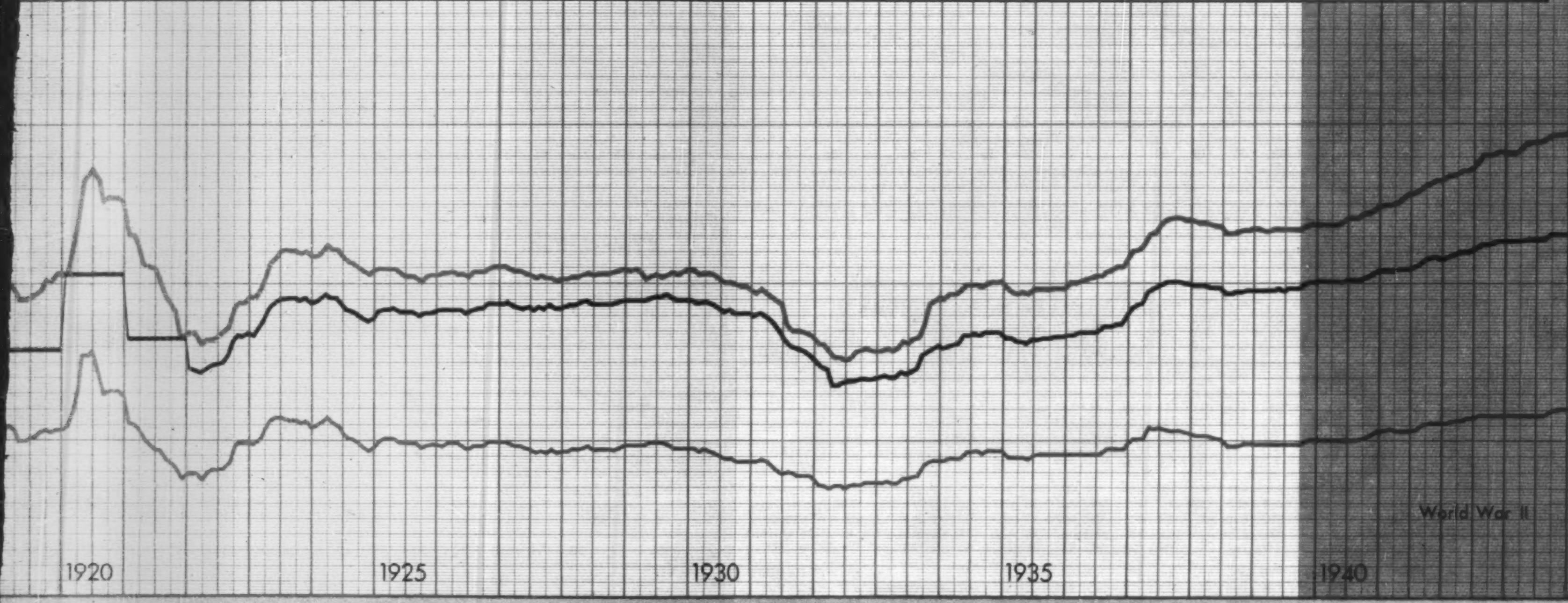
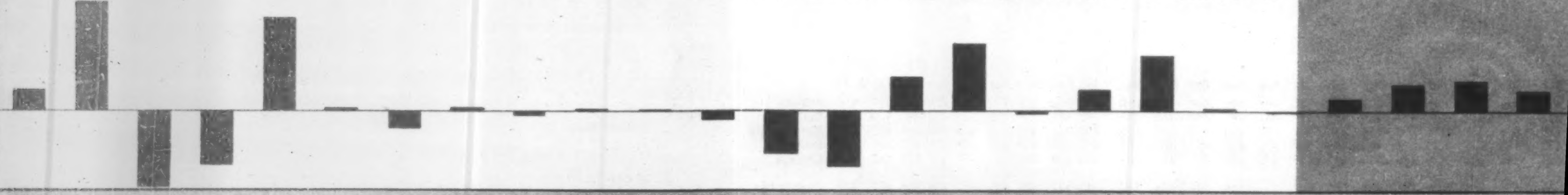
	269.4	303.7	319.5	393.7	442.7	475.4	484.9	538.6	549.9	587.8	614.7	645.2
	269.7	304.5	323.8	395.5	443.6	474.8	488.4	539.8	551.2	588.0	614.0	645.7
	271.8	306.4	334.6	399.6	443.6	474.3	491.9	540.6	554.7	590.1	615.4	647.5
	272.3	307.4	339.7	400.0	444.9	472.1	496.6	543.5	557.7	589.6	618.7	653.3
	274.2	309.0	348.7	406.6	455.8	473.8	506.9	543.4	562.3	593.7	621.9	656.0
	277.7	309.0	354.7	413.8	464.8	477.5	512.7	542.9	571.3	604.6	628.3	660.1
	281.6	309.1	361.4	422.9	477.1	478.3	521.4	543.5	584.3	612.6	641.7	672.2
	281.6	309.3	360.2	426.4	478.4	479.8	531.0	543.6	586.7	610.9	640.2	.....
	282.4	309.3	360.9	434.6	480.2	480.5	536.2	547.1	589.0	611.6	641.5	.....
	283.6	309.3	362.5	436.9	478.3	480.0	530.0	547.7	589.2	611.8	642.4	.....
	283.7	313.5	369.3	441.1	477.7	480.3	530.8	548.3	588.1	611.3	642.7	.....
	276.3	**307.8**	**346.0**	**413.2**	**460.7**	**477.0**	**509.6**	**542.7**	**569.4**	**600.0**	**628.0**	.....

BUILDING COST

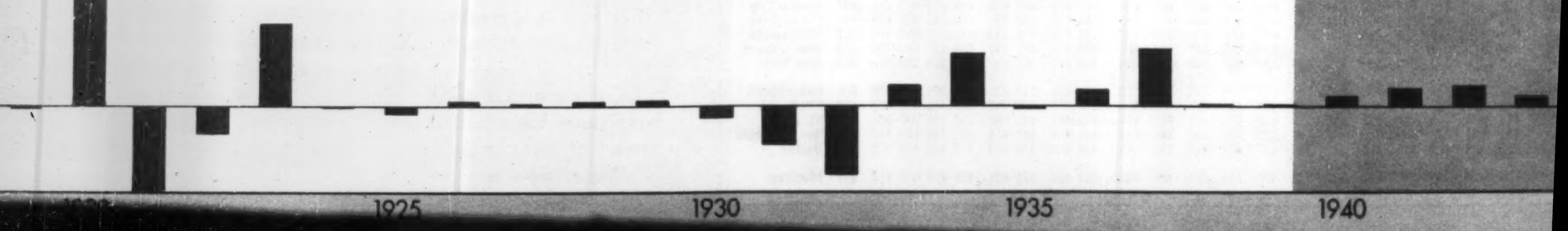
	1926	1932	1939	1940	1942	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Jan...	182.3	150.6	196.2	201.5	217.1	236.5	242.2	294.6	333.6	355.0	356.2	393.0	405.8	425.0	436.4	457.9
Feb...	183.7	147.2	196.2	201.5	218.4	237.7	243.9	301.6	335.5	352.9	356.5	398.2	406.2	425.2	437.1	459.4
Mar...	184.3	145.9	196.5	201.5	218.9	237.9	245.4	303.3	334.2	352.5	360.0	399.3	407.4	424.9	436.7	459.6
Apr....	184.1	135.7	196.5	201.4	219.6	238.5	254.4	305.2	334.6	351.4	362.8	400.1	407.9	426.4	437.5	460.6
May...	183.6	136.4	196.6	201.2	220.1	238.5	258.1	304.6	333.9	348.9	364.3	401.1	410.3	426.2	438.2	462.6
June..	181.8	137.6	196.4	201.7	221.2	239.4	265.3	307.4	339.3	349.3	373.4	400.8	412.5	426.2	439.7	464.8
July...	184.3	139.5	196.8	201.7	223.5	239.6	267.3	308.9	342.4	349.5	377.7	400.3	414.5	435.2	444.1	467.5
Aug...	185.1	138.4	196.5	201.7	225.4	239.9	272.3	317.8	355.5	350.9	383.1	400.2	422.4	436.9	455.5	478.0
Sept...	185.1	139.6	196.6	203.1	225.5	240.1	272.4	322.6	356.7	352.0	392.2	400.3	424.4	436.0	454.3	.....
Oct....	188.0	140.0	198.5	204.2	225.9	240.4	273.0	327.3	357.1	353.0	397.4	403.4	424.8	436.0	455.5	.....
Nov...	188.0	139.5	201.2	206.2	226.6	240.6	274.0	329.2	355.9	352.9	390.2	404.5	426.0	436.0	456.3	.....
Dec...	188.0	140.0	201.2	208.2	226.6	240.8	280.0	333.1	355.6	353.2	391.4	405.8	424.9	435.5	456.8	.....
Av....	**184.9**	**140.9**	**197.4**	**202.8**	**222.4**	**239.1**	**262.4**	**313.0**	**344.5**	**351.8**	**375.5**	**400.6**	**415.6**	**430.8**	**445.7**	.....

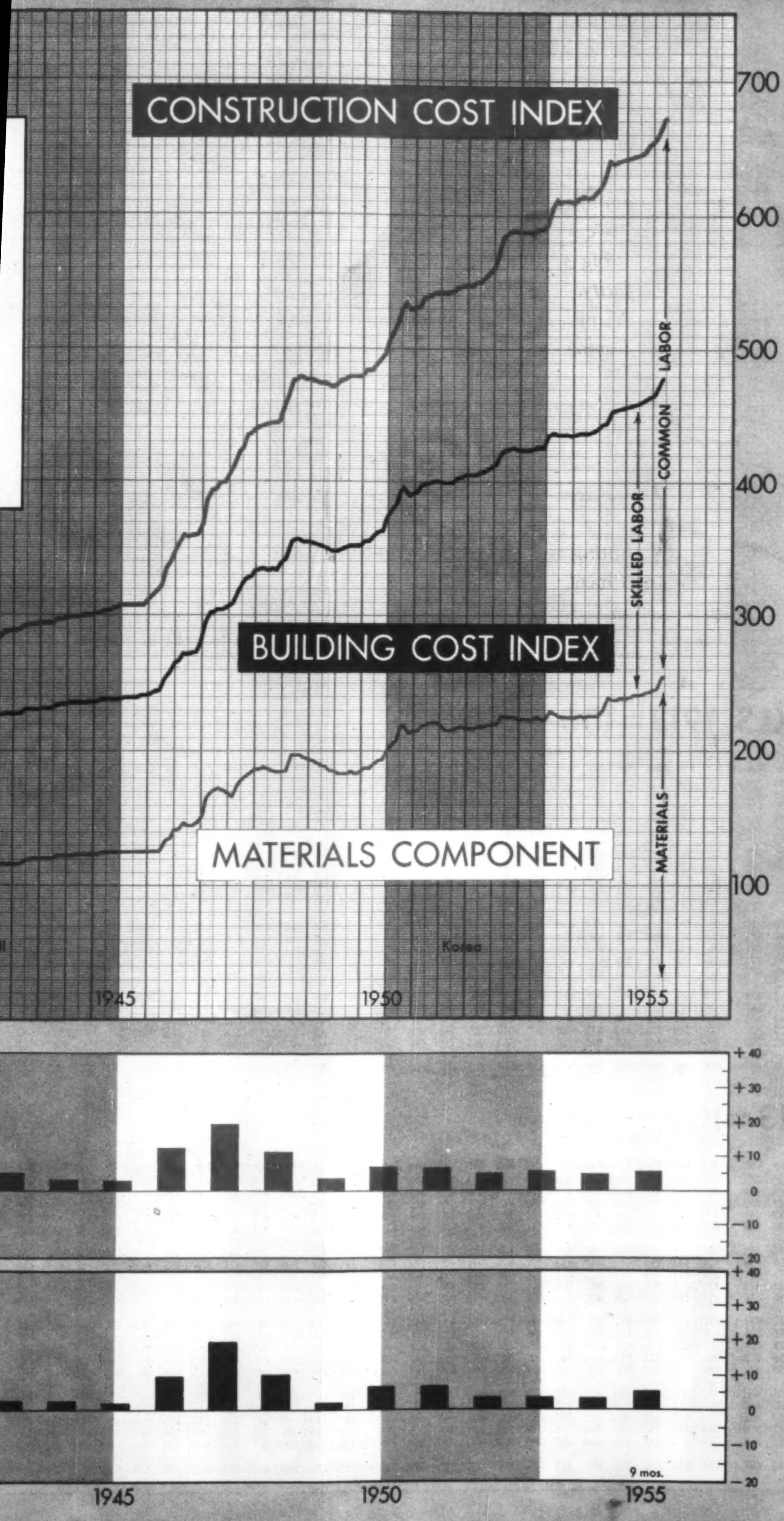


% CHANGE FROM PRECEDING YEAR IN CONSTRUCTION COST INDEX



% CHANGE FROM PRECEDING YEAR IN BUILDING COST INDEX





ENGINEERING NEWS-RECORD CONSTRUCTION AND BUILDING COST INDEXES

THE ENGINEERING NEWS-RECORD Construction Cost Index was established in 1921, based on price movements in structural steel, portland cement, lumber and common labor. The Building Cost Index was introduced in 1938 to measure also the effect of skilled wage trends on costs. It uses the same materials as those in the construction cost index but skilled labor, instead of common labor.

A few minor changes have been made in these indexes over the years necessitated by changed conditions in the market. These are recorded in full in ENR, September 1, 1949, page 398, together with a complete history of the development and use of these indexes. New values originally reported monthly at the beginning of each month have also been reported each week beginning July, 1954.

Both indexes are based on 1913=100 but are reported also each week on 1926=100 and 1949=100 bases. These are weighted aggregative indexes, thus base years can be shifted at will.

ENR Construction and Building Cost Indexes reflect wage rate and material price trends. They do not adjust for labor or job efficiency, materials availability, competitive conditions, management, mechanization or other "intangibles" affecting construction costs.

- **A hypothetical block of construction** requiring 6 bbls of cement, 1.088 M ft bm of lumber, 2,500 lbs of steel and 200 hrs of common labor is used in the **Construction Cost Index** to measure the trend of the cost of heavy construction.
- **A similar hypothetical block of construction** using the same quantities of materials, but 68.38 hrs of skilled labor is the basis for computing the **Building Cost Index.**

This simple structure was adopted to facilitate prompt reporting of changes due to price and wage rate movements, both as to direction and degree.

Both indexes have proved, over the years, infallible as to direction and, in normal times, accurate as to degree. Under abnormal conditions of increasing or decreasing job productivity, allowance for the "intangibles" listed above should be made in measuring the degree of change in overall completion costs, or in construction selling price trends.

Supplement to Engineering News-Record, September 29, 1955. Business News Department, Engineering News-Record, 330 West 42nd Street, New York 36, N. Y. Reprints are available at fifty cents each.

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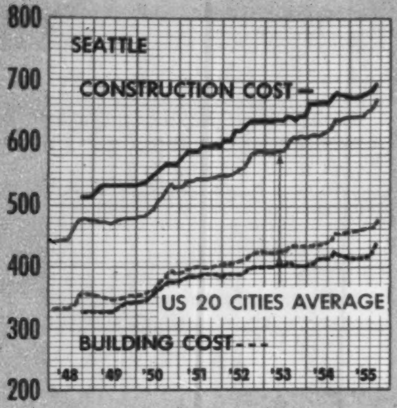
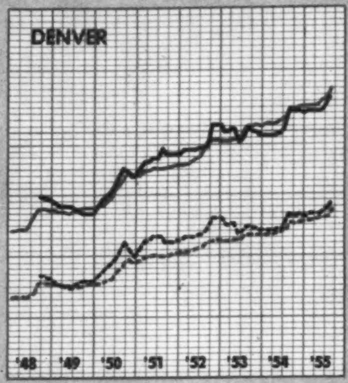
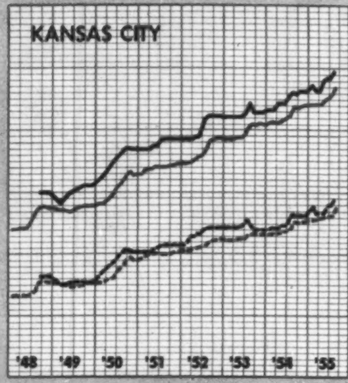
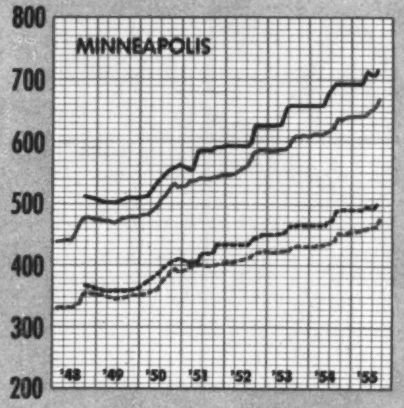
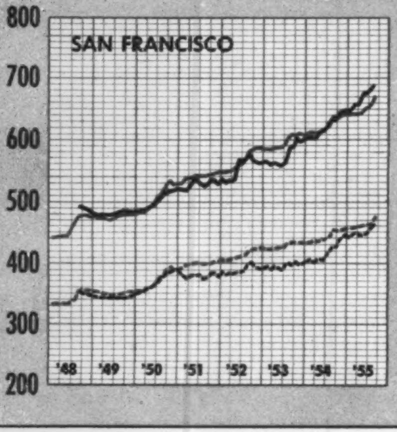
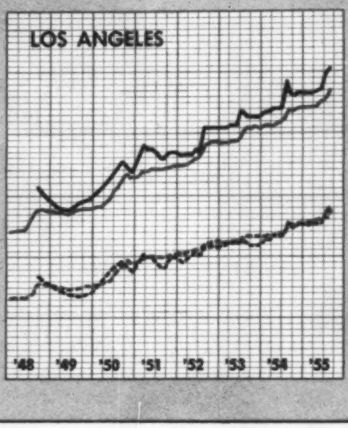


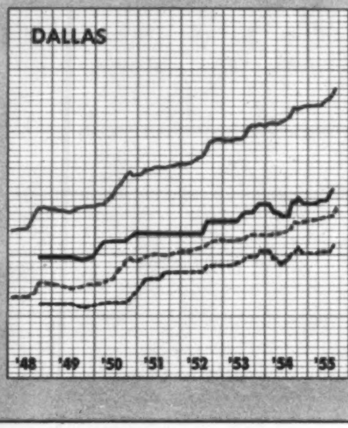


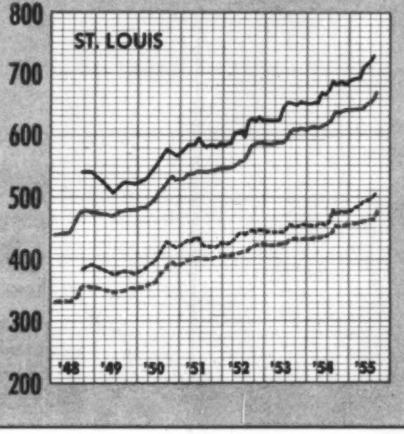










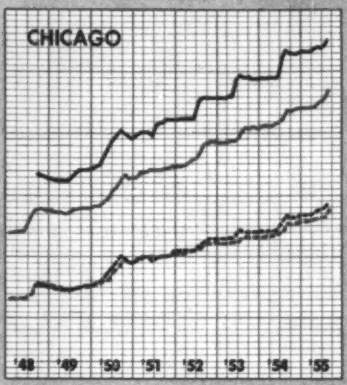


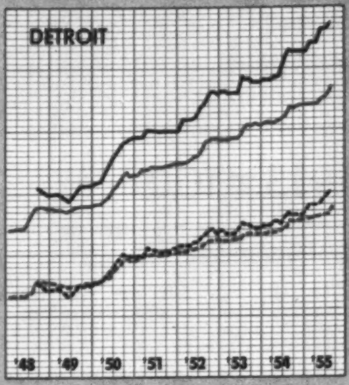
CONSTRUCTION COST INDEXES 1913=100

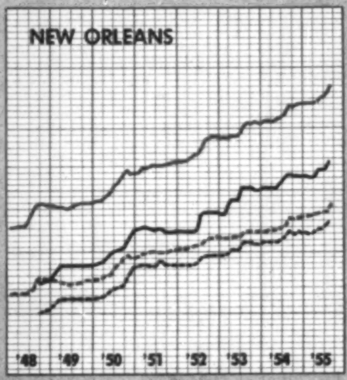
	1948		1949				1950				1951				1952												1953												
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Atlanta	325	345	345	345	345	345	354	354	394	390	395	395	395	395	395	395	395	395	395	397	397	402	402	418	418	418	418	424	424	438	438	438	444	460	460	460	460	460	460
Baltimore	462	462	462	425	424	424	427	462	479	474	486	488	482	513	510	510	510	508	509	511	525	531	530	530	533	526	528	528	524	528	525	525	531	554	551	553	553	553	553
Birmingham	378	379	379	389	389	377	381	381	388	413	416	416	416	416	416	416	417	417	417	417	445	450	450	450	450	450	450	450	450	449	447	447	454	469	469	469	469	465	465
Boston	513	508	507	526	525	532	536	556	570	563	576	586	590	588	585	588	590	587	611	614	625	630	630	633	633	629	626	626	626	627	625	623	630	630	626	626	624	624	626
Chicago	537	530	527	526	541	542	550	584	607	593	603	598	620	624	624	626	626	626	626	626	656	661	661	661	661	661	661	661	661	662	662	690	697	692	691	690	690	690	691
Cincinnati	505	505	490	487	496	496	502	510	558	553	559	556	543	548	547	547	547	549	549	553	551	612	612	612	611	609	609	609	609	613	613	613	639	637	633	633	633	631	630
Cleveland	535	523	520	514	525	530	537	578	605	587	607	606	603	626	624	625	625	668	685	685	685	686	684	683	683	682	680	682	682	682	683	706	712	711	709	709	708	708	709
Dallas	398	398	398	398	394	397	422	423	423	438	437	437	437	437	437	437	437	437	437	437	437	455	455	455	455	455	455	455	455	456	456	463	470	470	470	475	482	482	482
Denver	499	496	482	482	470	470	491	505	541	528	552	558	564	564	564	571	571	571	571	572	572	577	577	612	612	612	612	602	602	603	603	582	589	604	604	600	600	595	595
Detroit	511	500	501	489	514	515	521	555	583	592	592	602	601	601	601	621	621	621	622	625	641	646	656	666	666	663	665	665	663	663	663	663	689	687	687	682	682	682	685
Kansas City	500	500	484	501	511	511	528	551	571	570	570	575	586	586	586	586	586	586	588	588	618	623	623	623	623	623	623	623	623	623	623	623	629	643	630	630	630	630	631
Los Angeles	511	495	482	478	489	494	511	529	552	537	580	572	558	569	568	563	565	565	567	574	567	610	610	610	610	610	610	610	610	612	612	612	635	633	627	626	626	626	629
Minneapolis	512	510	504	504	512	512	516	538	555	562	557	587	587	592	593	593	593	593	593	593	593	598	628	628	628	628	628	628	628	629	629	655	661	661	661	661	661	661	661
New Orleans	350	354	379	379	379	379	383	402	408	438	441	439	434	435	435	435	435	435	435	437	461	466	466	466	466	466	461	461	476	486	486	486	506	506	506	506	502	502	506
New York	549	541	537	534	533	539	546	575	632	622	630	627	621	626	623	623	623	623	629	629	629	665	667	666	665	665	665	665	665	666	666	664	670	706	713	713	713	713	734
Philadelphia	470	467	462	492	517	515	518	541	556	575	575	575	582	582	582	582	601	601	601	616	631	636	636	636	636	636	636	636	636	637	635	635	641	666	666	666	666	666	666
Pittsburgh	470	502	502	492	492	492	497	499	532	529	531	531	551	557	557	557	557	557	557	557	600	607	607	607	607	607	607	607	607	608	608	608	640	640	640	640	640	640	643
St. Louis	542	542	527	508	524	522	529	552	579	569	585	597	584	587	584	587	587	605	605	608	599	626	629	626	631	628	627	627	627	626	626	648	654	654	653	650	655	654	654
San Francisco	490	484	478	478	483	483	486	495	513	519	518	533	525	527	534	529	532	532	535	565	562	570	573	562	560	559	560	561	557	561	558	556	561	588	587	601	597	600	601
Seattle	512	512	530	530	530	530	534	548	564	563	586	586	593	592	606	606	606	620	620	620	627	632	635	635	635	635	635	635	635	636	636	636	642	642	636	643	643	643	664
Montreal	406	408	407	408	396	394	397	397	428	427	445	473	484	484	502	500	500	500	500	510	510	512	512	512	512	512	515	516	516	516	516	516	516	540	550	550	550	550	550

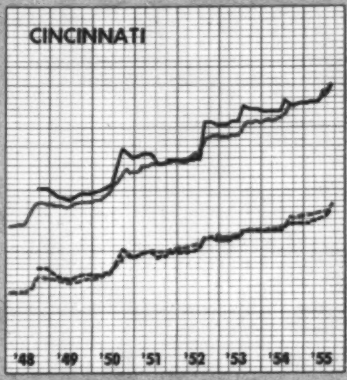
BUILDING COST INDEXES 1913=100

	1948		1949				1950				1951				1952												1953												
	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Atlanta	302	308	308	308	309	313	316	316	339	339	339	339	339	351	351	351	351	351	351	353	356	364	364	368	371	371	371	376	376	376	376	376	383	394	394	394	394	394	394
Baltimore	375	387	387	349	354	351	354	375	391	387	398	403	398	413	410	410	410	407	409	414	415	421	420	420	423	416	418	418	414	418	415	415	425	429	427	428	428	428	428
Birmingham	320	321	326	329	330	319	321	321	328	345	351	351	351	353	353	353	355	355	355	358	361	366	372	372	372	372	372	372	372	370	372	372	382	382	390	390	390	386	386
Boston	363	357	357	362	361	372	375	379	396	392	404	407	412	410	407	410	411	409	419	422	421	426	426	429	429	425	422	422	422	422	421	419	428	434	433	435	433	433	435
Chicago	360	353	350	349	352	353	361	381	404	391	401	395	408	413	413	415	415	415	415	416	421	428	432	433	433	433	433	433	433	434	434	443	449	444	443	443	443	443	444
Cincinnati	374	374	358	356	362	362	360	368	406	392	400	398	395	401	400	400	400	402	402	406	408	423	423	423	422	420	420	420	420	424	424	424	435	433	435	436	436	434	433
Cleveland	352	339	337	332	342	349	356	379	406	388	402	402	399	403	401	403	403	410	419	419	423	432	431	429	429	428	426	428	430	430	431	435	442	441	439	439	438	438	439
Dallas	322	322	322	322	316	318	322	323	323	338	362	362	371	371	371	371	371	371	371	371	371	382	382	382	382	382	382	382	382	383	387	387	394	397	397	397	405	405	405
Denver	369	365	351	351	359	359	378	395	423	400	426	432	423	425	425	431	431	431	431	433	436	441	452	462	462	462	462	452	452	453	453	434	440	449	449	446	446	441	441
Detroit	358	347	348	336	351	351	357	376	404	400	402	411	410	416	419	419	419	419	422	424	430	435	439	442	442	438	441	441	438	438	438	441	452	450	450	446	446	446	448
Kansas City	366	367	352	357	357	357	374	390	410	406	406	411	417	417	417	417	431	431	434	434	441	446	446	446	446	446	446	446	446	446	446	452	458	455	442	442	442	442	442
Los Angeles	368	356	343	339	336	340	360	380	392	377	403	395	381	398	397	392	394	399	401	407	401	415	415	415	415	415	416	418	420	421	421	421	426	426	420	419	419	419	422
Minneapolis	370	368	361	361	361	363	377	389	406	413	408	421	423	438	438	438	438	438	438	438	438	443	450	450	454	454	454	454	454	455	453	459	467	468	468	438	468	468	468
New Orleans	302	310	325	325	325	325	329	340	346	376	379	377	379	379	379	379	379	379	379	381	391	396	397	397	397	397	397	397	398	407	407	407	419	419	419	419	416	416	419
New York	403	395	400	398	397	402	410	439	464	459	466	463	457	462	460	460	460	460	465	465	465	484	487	485	484	484	484	484	484	485	485	483	494	498	505	507	507	507	512
Philadelphia	394	391	386	394	394	392	397	415	430	449	449	449	456	461	461	461	462	462	462	472	472	477	477	477	480	480	480	480	480	481	479	479	490	492	494	494	494	494	494
Pittsburgh	376	384	384	375	375	377	382	387	401	397	400	400	405	416	416	416	416	416	416	416	419	427	427	427	439	439	439	439	439	440	440	440	460	460	460	460	460	460	460
St. Louis	385	391	386	375	379	377	384	396	431	421	432	436	422	427	424	427	429	431	441	444	442	445	448	445	450	447	446	446	446	446	446	446	452	458	457	454	455	455	455
San Francisco	350	347	341	341	341	345	352	361	383	389	375	380	377	379	385	381	383	383	386	386	388	398	401	393	391	390	391	395	391	395	392	390	398	398	397	401	398	400	401
Seattle	328	328	328	328	340	341	344	358	374	374	384	384	389	383	389	389	389	389	389	389	392	397	400	400	400	400	400	400	400	401	401	401	408	408	402	402	402	402	405
Montreal	314	316	315	316	316	314	317	317	346	345	363	378	385	385	385	383	383	383	383	393	393	396	395	395	395	395	398	399	399	399	399	399	399	423	430	430	430	430	430









	1953	1954												1955									
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	8/18	
	60	460	460	458	458	458	458	458	464	474	474	474	474	474	474	474	474	472	472	472	492	492	**Atlanta**
	53	553	552	549	549	551	548	548	572	573	573	578	578	575	575	574	574	575	575	581	594	594	**Baltimore**
	65	465	465	465	465	465	465	466	486	488	503	503	507	511	511	511	511	511	511	511	519	519	**Birmingham**
	24	626	626	627	628	659	659	663	671	669	669	671	671	674	676	675	691	694	696	696	709	709	**Boston**
	90	691	691	692	692	692	693	726	738	734	733	733	734	736	736	736	738	742	741	742	751	752	**Chicago**
	31	630	630	630	630	630	630	650	644	641	641	641	642	642	642	645	645	647	664	664	673	673	**Cincinnati**
	08	709	709	712	711	711	731	740	738	738	739	750	751	752	754	759	759	762	762	777	785	785	**Cleveland**
	82	482	482	470	470	465	465	465	487	487	494	484	484	484	484	484	488	488	488	498	507	507	**Dallas**
	95	595	595	595	595	597	597	609	638	633	633	635	632	632	635	635	635	635	637	647	656	656	**Denver**
	82	685	685	685	689	690	700	721	732	729	729	729	729	730	743	743	743	763	763	767	776	776	**Detroit**
	30	631	633	635	645	645	645	653	662	661	663	663	663	667	676	665	666	681	686	686	695	698	**Kansas City**
	26	629	634	634	640	640	640	641	684	665	662	667	667	667	667	667	668	669	672	696	705	705	**Los Angeles**
	61	661	661	661	661	661	681	682	697	697	697	697	697	697	697	697	697	717	711	711	720	720	**Minneapolis**
	02	506	506	506	506	506	516	520	528	528	525	525	523	524	522	522	523	534	535	536	545	545	**New Orleans**
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	40	643	645	645	645	645	645	645	654	666	654	654	654	654	654	657	667	667	669	671	690	690	**Pittsburgh**
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	00	601	605	602	605	616	617	624	632	631	643	646	649	647	651	658	655	675	676	680	688	690	**San Francisco**
	43	664	664	664	665	665	665	665	677	682	679	679	676	676	676	676	678	680	681	684	693	693	**Seattle**
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	1953	1954												1955									
	ec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	8/18	
	94	394	394	392	392	392	392	392	398	400	400	400	400	400	400	400	400	399	399	401	417	417	**Atlanta**
	28	428	428	424	424	426	423	423	447	448	448	453	455	452	452	450	451	452	452	457	470	470	**Baltimore**
	86	386	386	386	386	386	386	387	406	409	416	416	420	423	423	423	423	423	423	423	432	432	**Birmingham**
	33	435	435	436	437	438	438	442	450	448	451	453	453	457	459	458	458	468	471	474	488	488	**Boston**
	43	444	444	445	445	445	449	458	470	467	466	466	468	469	469	469	471	475	477	478	487	488	**Chicago**
	34	433	433	435	435	434	434	437	444	444	444	444	445	447	447	450	450	452	456	458	467	467	**Cincinnati**
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	07	512	511	509	509	509	516	518	526	526	526	526	528	532	531	531	531	531	533	533	548	548	**New York**
	94	494	494	494	494	503	503	503	511	516	516	516	516	521	521	521	521	521	523	524	533	533	**Philadelphia**
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	00	401	405	402	406	406	407	417	425	423	436	440	443	441	444	447	444	444	445	454	463	469	**San Francisco**
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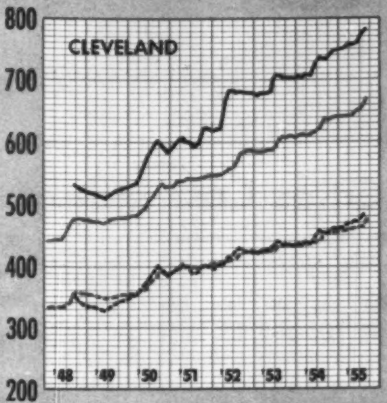

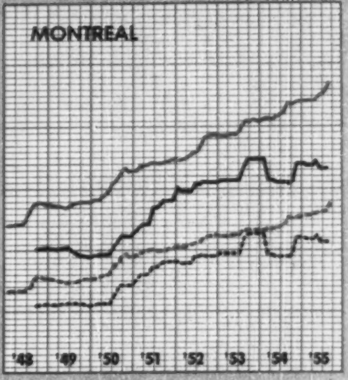

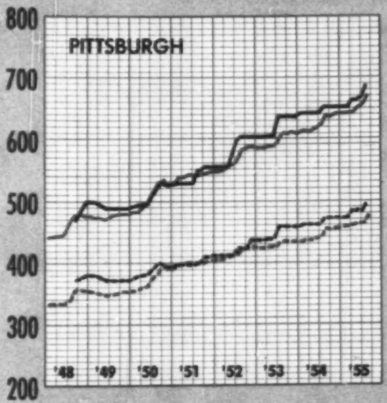

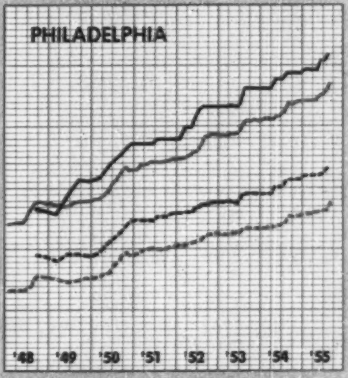

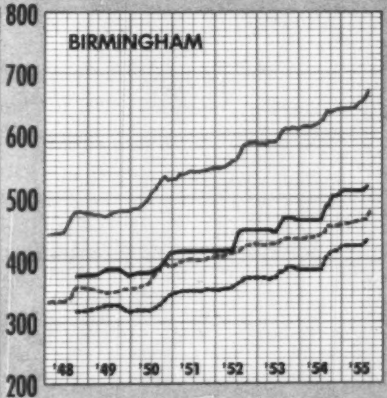

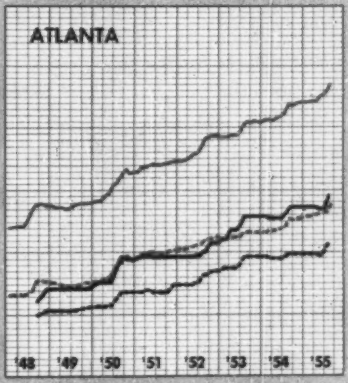

ENR Cost Indexes i

Components of Construction Cost Index and weighting in U.S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement, bulk, 1.088 M ft bm 2x4, S4S lumber, 200 hr common labor, at local prices.

In Canada, warehouse price has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949 — the average of Canadian and U.S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for USA cities.

Components of Building Cost Index and weighting are same but 68.38 hr of skilled labor is used instead of common labor.

These regional indexes were first reported quarterly from
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July 1954.

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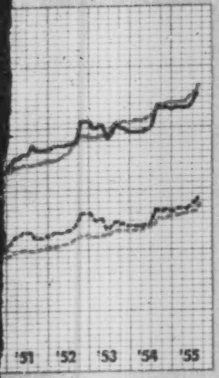

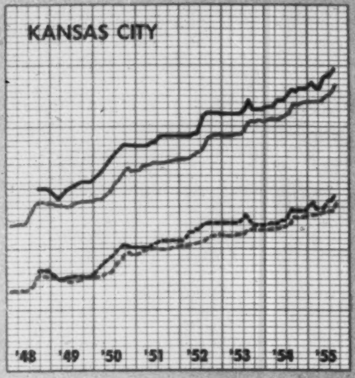

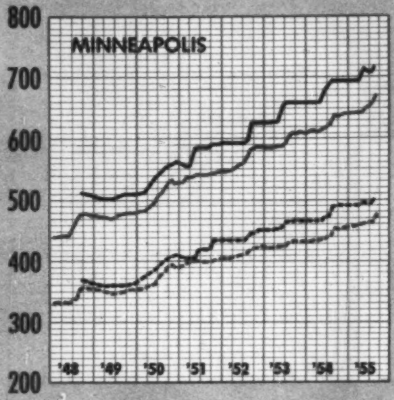

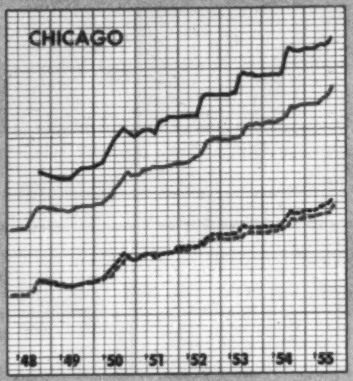

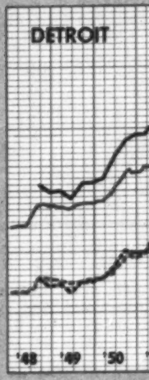

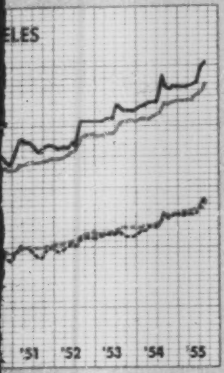

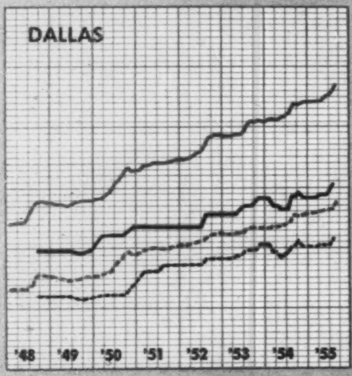

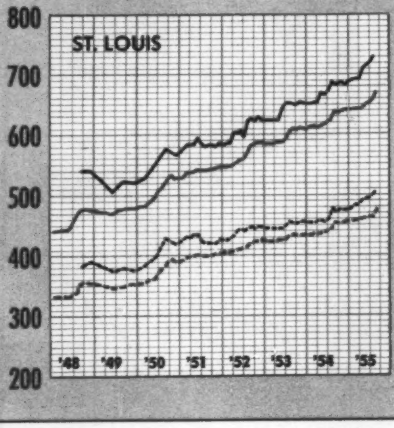

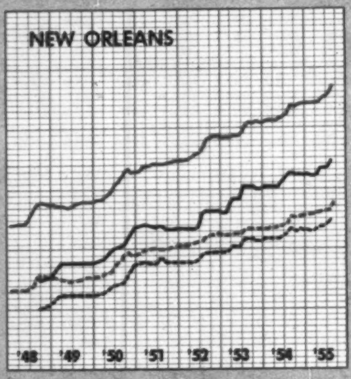

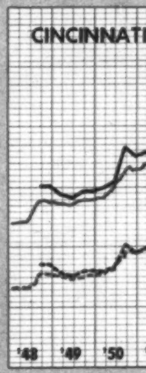

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1913=100

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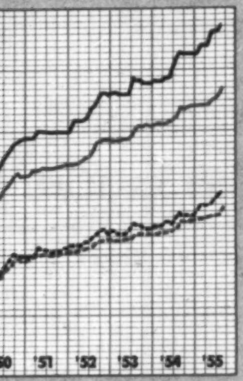
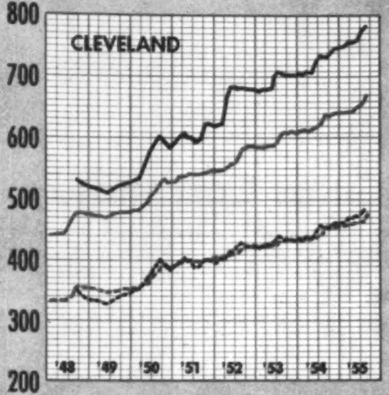
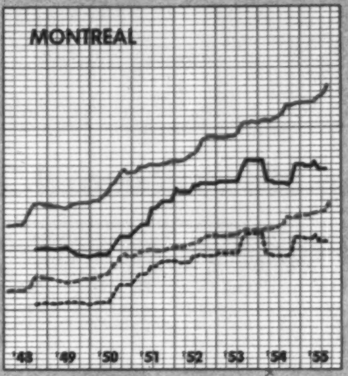
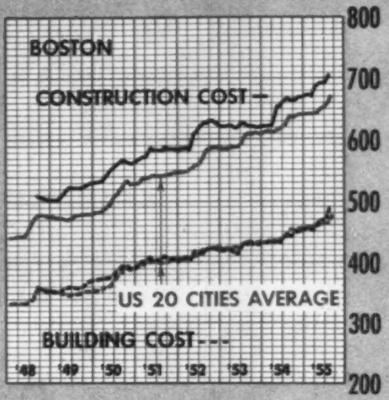
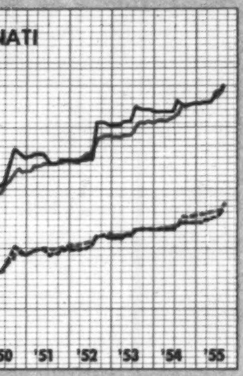
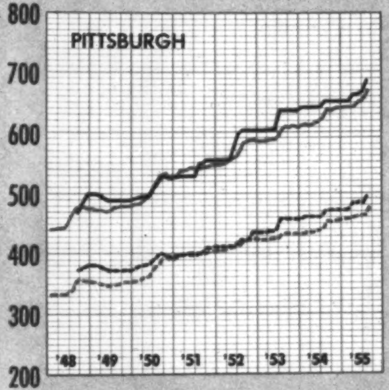


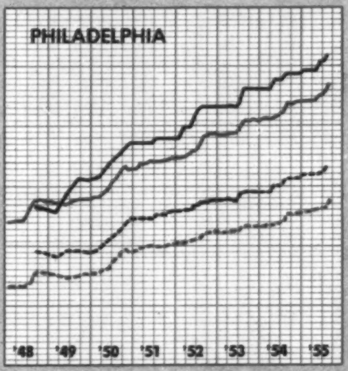


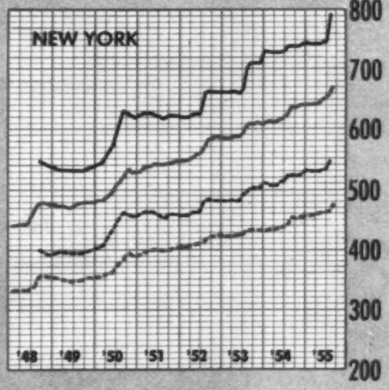


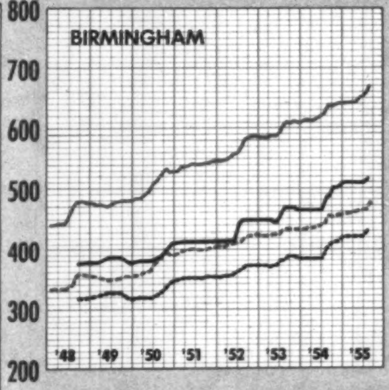


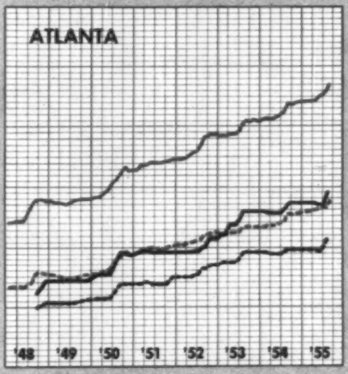


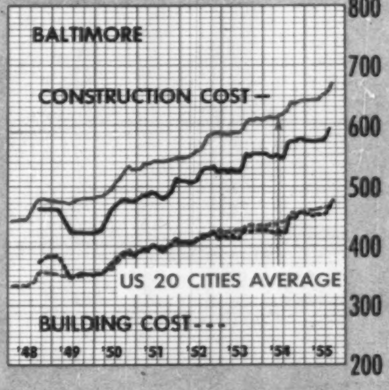












1955 May	Jun	Jul	Aug	8/18	
472	472	472	492	492	**Atlanta**
575	575	581	594	594	**Baltimore**
511	511	511	519	519	**Birmingham**
694	696	696	709	709	**Boston**
742	741	742	751	752	**Chicago**
647	664	664	673	673	**Cincinnati**
762	762	777	785	785	**Cleveland**
488	488	498	507	507	**Dallas**
635	637	647	656	656	**Denver**
763	763	767	776	776	**Detroit**
681	686	686	695	698	**Kansas City**
669	672	696	705	705	**Los Angeles**
717	711	711	720	720	**Minneapolis**
534	535	536	545	545	**New Orleans**
747	750	750	794	794	**New York**
696	711	712	721	721	**Philadelphia**
667	669	671	690	690	**Pittsburgh**
716	720	723	731	731	**St. Louis**
675	676	680	688	690	**San Francisco**
680	681	684	693	693	**Seattle**
548	537	537	537	537	**Montreal**

1955 May	Jun	Jul	Aug	8/18	
399	399	401	417	417	**Atlanta**
452	452	457	470	470	**Baltimore**
423	423	423	432	432	**Birmingham**
468	471	474	488	488	**Boston**
475	477	478	487	488	**Chicago**
452	456	458	467	467	**Cincinnati**
475	477	480	489	489	**Cleveland**
406	406	406	419	422	**Dallas**
470	474	475	485	485	**Denver**
481	490	494	503	503	**Detroit**
469	479	479	488	490	**Kansas City**
454	457	471	480	480	**Los Angeles**
499	493	493	502	502	**Minneapolis**
439	439	441	450	450	**New Orleans**
531	533	533	548	548	**New York**
521	523	524	533	533	**Philadelphia**
488	489	487	498	498	**Pittsburgh**
490	495	497	506	506	**St. Louis**
444	445	454	463	469	**San Francisco**
417	418	424	436	436	**Seattle**
428	417	417	417	417	**Montreal**

ENR Cost Indexes in 21 cities

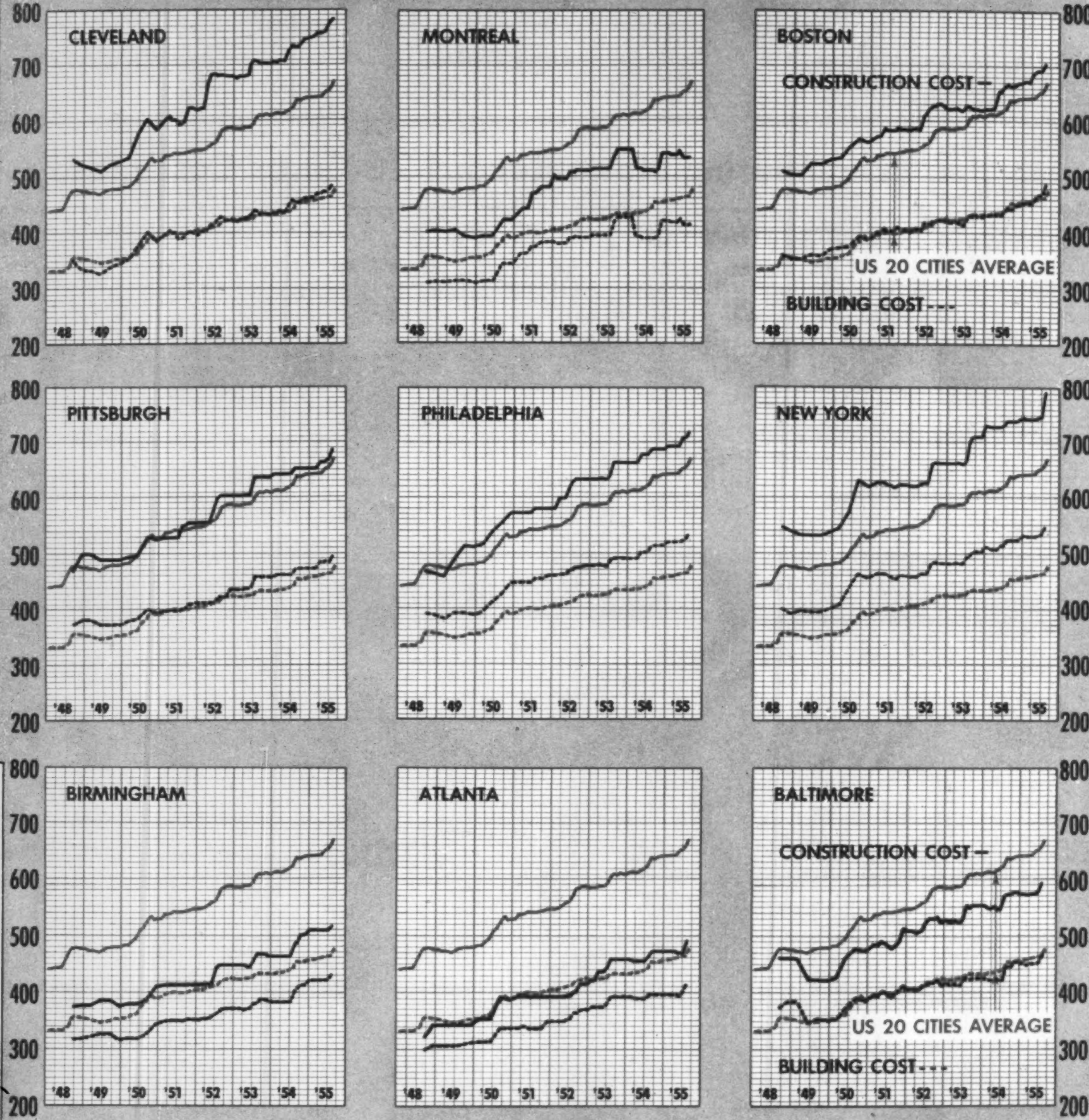
Components of Construction Cost Index and weighting in U.S. cities are: 25 cwt structural steel shapes, base mill price; 6 bbl portland cement, bulk, 1.088 M ft bm 2x4, S4S lumber, 200 hr common labor, at local prices.

In Canada, warehouse price has to be used, so 15 cwt is weighting for steel. Price of Canadian steel is used prior to Oct. 1949 — the average of Canadian and U.S. steel prices is used after devaluation of Canadian dollar in Oct. 1949. Cement weighting is 10 bbl. Other elements are same as for USA cities.

Components of Building Cost Index and weighting are same but 68.38 hr of skilled labor is used instead of common labor.

These regional indexes were first reported quarterly from September 1948 through March 1951, then monthly beginning April 1951. Each of the 21 cities indexes together with their components, has been reported weekly in Construction Daily starting July 1954.

These ENR Cost Indexes measure movements in the cost to contractors and engineers of construction materials and labor. They do not adjust for productivity. Where major differences between cities occur, the main reason is found usually in wage differentials. Lower wages are often accompanied by lower productivity, hence allowances for job productivity should be made in estimating end-product-price, or construction selling-price trends based on the cost trends shown here.



ENR Cost Indexes in 21 cities

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1954-55 ANNUAL REPORT ON

Construction Costs

BY ENGINEERING NEWS-RECORD

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THE CONSTRUCTION boom added materials shortages and slow deliveries to the rising costs problems of 1955. Thus unscheduled costs piled on top of those calculated costs that were already a major concern of construction men.

The squeeze continued for contractors between their low bid prices and higher materials and labor costs. Bids fifteen percent or more under engineers' estimates were common. This left millions of dollars to come back into the market in the form of additional calls for bids, notably in the case of highways.

More and more a keen knowledge of cost and price movements and trends is an essential tool for both engineers and contractors.

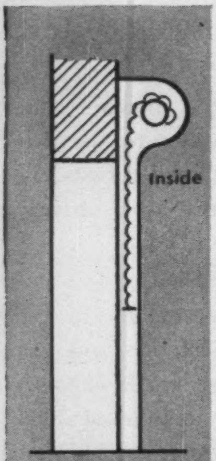
This issue, in the pages which follow, is dedicated to sharpening that tool.

MOST
VERSATILE
DOOR

Six Basic Ways to Install

Kinnear Steel Rolling Doors

To Save Maximum Space, and Fit Any Building Design



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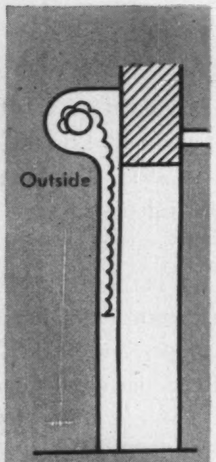

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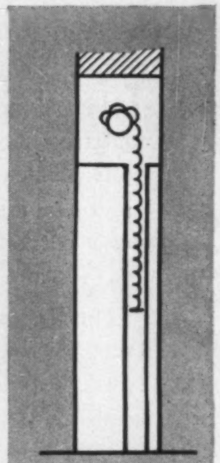

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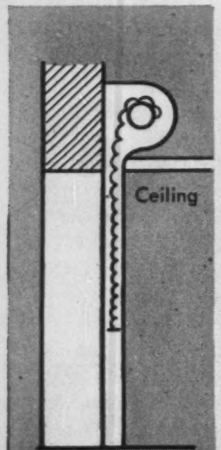
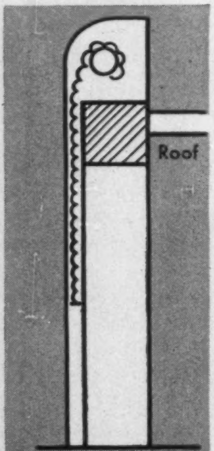
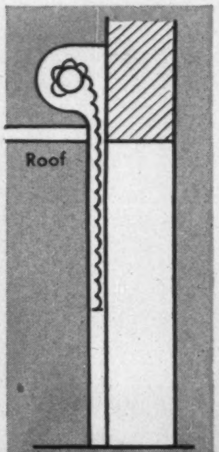


MOUNTED ABOVE CEILING



MOUNTED ON TOP OF WALL



MOUNTED ABOVE ROOF

The compact hood in which the Kinnear Rolling Door coils when opened, can be installed inside or outside the building . . . in the wall or on top of it . . . above the ceiling or above the roof . . . above or below the opening. The door can even be installed at any angle, (as shown below), upside down or horizontally.

In short, Kinnear Rolling Doors not only give you rugged, long-lasting, low-cost space-saving efficiency; they also adapt easily to *any building design or operating need.*

Kinnear Rolling Doors can be installed so that every inch of floor, wall and ceiling space around a doorway (inside, outside, or on both sides of the opening) is fully usuable at all times.

When opened, Kinnear Rolling Doors clear *the entire door area,* and stay out of reach of wind or traffic. When closed, they provide an all-steel barrier against fire, wind, intrusion, or vandalism. Built any size, with manual, mechanical or electric-motor operation. Easily installed in old or new buildings. Write for additional information.

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SAVING WAYS in DOORWAYS

KINNEAR
ROLLING DOORS

The '56 Outlook for Construction Costs

More capacity to produce and deliver basic construction materials will be the big factor in coming months, if construction men are to continue to hold their prices down in the face of rising costs.

This year's construction boom outran all predictions and produced shortages in steel, cement, plywood, in boxcars for carrying lumber, in copper and copper tubing, in aluminum sheets, in gypsum products particularly wall board and lath. The boom shows every sign of continuing unabated with consequent pressure on materials supplies.

• **Materials costs** went up faster than wage rates this year, up 6.7 percent in the ENR cost indexes compared with 3.3 to 3.7 percent for labor. But this does not include the high costs of slow deliveries and waits for materials, or purchases at premium prices.

• **Wages increased** from two to four percent for the year but averaged 3.7 percent for common labor, 3.3 percent for the three skills, carpenters, bricklayers and structural steel workers, including fringe benefits. Many of the new contracts have built-in increases effective in six-month or yearly periods for the duration of the contract. More of the new contracts are for two years and several are for the next five years.

• **The construction cost rise** is 5.1 to 5.5 percent as measured by the ENR indexes. This is more than the 3% rise that was predicted a year ago.

Thus this rise increased its momentum again this year and it shows no signs as yet of topping out. This is what the Petit Momentum Net Change and Trend Recognition Curves tell their readers in the pages that follow.

• **Construction selling prices** have continued low in relation to the rise in costs. There is ample evidence to support this fact in the pages where the bid price indexes are compared with the basic cost indexes, and where unit prices bid by contractors are shown.

However, some upturns in bid prices are evident in the West, with evidence that the ability of contractors to outwit the cost rise has about reached its limit.

The remarkable performance of contractors, engineers and architects in keeping construction "selling prices" down while basic costs for labor and materials have moved inexorably up can be credited to good design and management, and to high volume and turnover that enables contractors to work on a smaller profit margin.

The unit prices show also that more and more construction extends or replaces earlier structures, thus includes demolition and removal costs as well as strictly new construction.

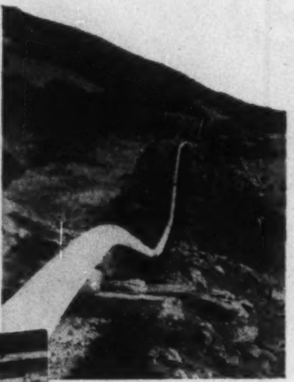
• **Financing,** plentiful last year, tightened up this year along with government action designed to slow down and extend the construction boom and prevent it from blowing its top.

A couple of the big toll highway bond issues were withdrawn because of the higher rates for money, but will come back into the market at a more "favorable" time.

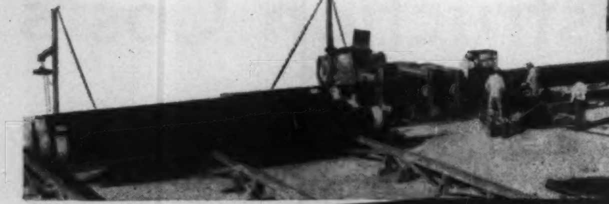
The effect on housing of the down-payment increase and higher mortgage rates is not evident as yet. The housing boom continues.

• **In the year ahead,** look for an increase, already begun, in contractor's prices.

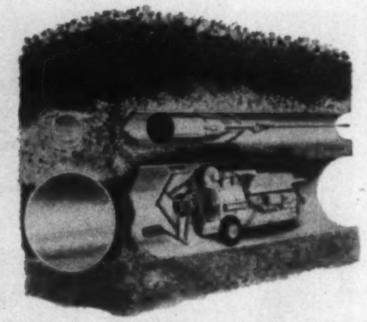
Look also for a rise of 3 to 4 percent in basic materials and labor costs. Part of this is already built into wage agreements, part will depend on the amount of the new steel price rise expected next year.



Somastic® Pipe Coating applied to the exterior of ½" to 30" diameter pipe.



Pipe sizes 4" through 34" carefully wrapped to your specifications.



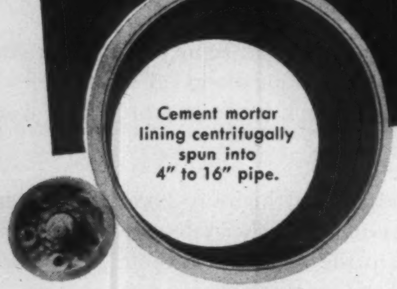
Steel or cast iron pipe lines 4" to 144" in diameter lined with cement mortar by either Tate or Centriline process.

9 REASONS WHY...

it will pay you to do business with Pipe Linings, Inc.

Pipe Linings, Inc. offers you...

1. Specialization in pipe protection problems
2. Complete service—
   Cement mortar lining of pipe lines "in place", to both AWWA and Federal specifications • Exterior protection. Somastic® Pipe Coating for corrosion resistance • Pipe wrapping to your specifications • Centrifugal spinning of cement mortar lining on in-plant machinery • Pipe reclamation. Permanent plant. Portable plant • Pipe cleaning • Pipe straightening • Pipe blasting • Spot welding of pits in pitted pipe • Pipe re-beveling.
3. Expert engineering assistance
4. Experienced plant and field personnel
5. Equipment especially designed to cut costs . . . proved over years of operation
6. Fully integrated plant facilities
7. Fully integrated field facilities
8. The ability to meet specific requirements of each customer on an individual basis
9. An organization with experienced management and adequate financial backing

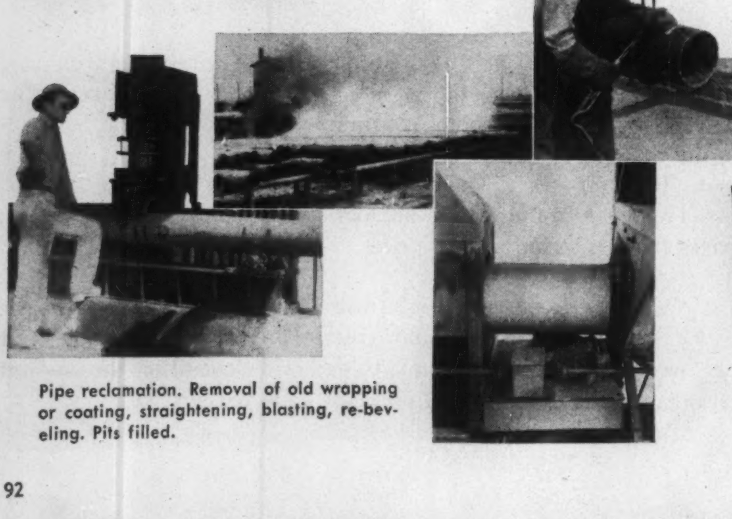


Cement mortar lining centrifugally spun into 4" to 16" pipe.

Leaky and corroded pipe lines cost money!

In product loss • In lost capacity
In increased pumping costs
In excessive maintenance costs

Write today on your organization letterhead for new brochure covering all phases of Cement Mortar Lining of Pipe Lines "In Place."



Pipe reclamation. Removal of old wrapping or coating, straightening, blasting, re-beveling. Pits filled.

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Engineering News-Record Construction & Building Cost Indexes—1913 = 100

The tables of values for selected years and the graphs of the complete index from 1913 to date are to be found on the colored insert chart preceding this page.
Backing the 20-city-average charts are the complete tables and graphs recording the indexes for each of 20 U S cities and 1 city in Canada.

ENR Cost Indexes For Other Base Years

Engineering News-Record Cost indexes may be converted to any base year desired:

Index Value	Construction Cost Base Years '26=	'39=	'40=	'49=	Building Cost Base Years '26=	'39=	'40=	'49=
Year	100	100	100	100	100	100	100	100
1926....	100	88	86	44	100	94	91	53
1928....	99	...	...	...	102	...	...	...
1929....	100	...	...	...	103	...	...	...
1930....	98	...	...	...	100	...	...	...
1931....	87	...	...	...	91	...	...	...
1932....	75	...	...	...	76	...	...	...
1933....	83	...	...	...	80	...	...	...
1939....	113	100	...	...	107	100	...	...
1940....	116	103	100	...	110	103	100	...
1941....	124	109	107	...	114	107	104	...
1942....	133	117	114	...	120	113	110	...
1945....	148	131	127	...	129	121	118	...
1946....	166	147	143	...	142	133	129	...
1947....	199	175	171	...	169	159	154	...
1948....	222	196	190	...	186	175	170	...
1949....	229	203	197	100	190	178	173	100
1950....	245	216	211	107	202	190	185	107
1951....	261	230	224	114	217	203	198	114
1952....	274	242	235	119	225	211	205	118
1953....	288	255	248	126	233	218	212	122
1954....	302	267	260	132	241	226	220	127
	a	b	c	d	a	b	c	d

For conversion factors a, b, c, d, see table below.

Conversions to other base years are made by simple ratios:

$I_{nb} = \frac{I_{ob}}{I_{nby}} \times 100$ where
I_{nb} is index on new base
I_{ob} is index value on old base
I_{nby} is old base index value for new base year

How to Convert Indexes To Other Base Years

To change base years for Engineering News-Record Construction and Building Cost Indexes, divide by following conversion factors;

To convert from base 1912=100 to base below	Divide 1912=100 values for Construction Cost Index by	Building Cost Index by
1949=100..............d	4.7702	3.5179
1947-49=100...........	4.5033	3.3642
1940=100..............c	2.4196	2.0281
1939=100..............b	2.3551	1.9744
1926=100..............a	2.0803	1.8499
1925-29=100............	2.0695	1.8648
1926-29=100............	2.0702	1.8747
1929=100...............	0.0702	1.9086
1910-14=100............	0.9380	0.9477
1924=100...............	2.1536	1.8578
1923-25=100............	2.1204	1.8481
1914=100...............	0.8856	0.9191
1911=100...............	0.9343	0.9414

Applies to 20-cities Index, not to individual cities

a,b,c,d conversion factors—used to get the accompanying table showing ENR cost index values for four different base years, 1926, 1939, 1940, 1949.

History and Use of ENR Cost Indexes

ENR's construction cost index was established in 1921 to measure the crazy ups and down of prices following World War I. It was carried back to 1913 by months and to 1903 by years.

The Building Cost Index was established in 1938 when common labor rates began to move up faster than skilled rates.

Both indexes reprice hypothetical blocks of construction made up of the big three materials, steel, lumber, cement and the big four construction trades, common labor, carpenters, bricklayers and iron workers. These are weighted like this:

Cost Index Weighting Components		Construction	Building
Steel	cwt	25	25
Lumber, 2x4s	Mbf	1.088	1.088
Cement	bbl	6	6
Common labor	hr	200	..
Skilled labor	hr	..	68.38

Steel is priced at three mills—Pittsburgh, Gary, Birmingham

Skilled labor is priced by a straight average of carpenter, bricklayer and structural ironworker rates

Cement is priced in bulk, fob city, cash discount not deducted

Lumber is S4S, carlots, fob city except fob mill in Atlanta, Birmingham, New Orleans, Seattle; delivered in Dallas, Detroit, St. Louis; lcl at yard in Los Angeles, Minneapolis and delivered in trucklots in New York

Values for both indexes in each of the 20 US cities for which ENR reports prices and for 1 city in Canada are available from September 1948 to date, quarterly until 1951 then monthly.

Both indexes, the 20-city averages and for each of the cities separately, are now computed weekly and published in CONSTRUCTION DAILY.

These indexes are widely used to up-date cost estimates, to establish reproduction new values, to interpolate special purpose but less frequent and timely indexes, to serve as the base for constructing a special purpose index, to deflate construction dollar volume statistics and measure volume in "constant" dollars.

Construction Dollar Volume Compared With Volume Index

Year	Engineering construction volume million $	1913 $ volume equals 100	ENR volume index* 1913=100
1925...............	$2,559	426	218
1926...............	2,854	475	246
1927...............	3,254	541	279
1928...............	3,579	595	305
1929...............	3,950	657	334
1930...............	3,173	528	273
1931...............	2,432	404	226
1932...............	1,219	203	134
1933...............	1,068	178	110
1934...............	1,361	226	120
1935...............	1,590	264	143
1936...............	2,387	397	204
1937...............	2,438	405	190
1938...............	2,792	464	213
1939...............	3,003	499	228
1940...............	3,987	664	299
1941...............	5,869	976	430
1942...............	8,006	1,331	546
1943...............	3,062	509	204
1944...............	1,730	288	110
1945...............	2,289	381	146
1946...............	5,176	844	298
1947...............	5,659	941	271
1948...............	7,219	1,200	304
1949...............	8,157	1,358	345
1950...............	13,342	2,220	549
1951...............	13,605	2,264	522
1952...............	15,689	2,610	577
1953...............	15,171	2,524	506
1954...............	14,412	2,396	481
1955 (8 months)....	12,348	3,049	611

* corrected for cost changes by dividing dollar volume by ENR construction and building cost indexes and reducing to 1913=100

Composite Construction Cost Index—1947-49 = 100

Building Materials & Construction Div., Department of Commerce

By years		By months	1949	1950	1951	1952	1953	1954	1955
'34	48.2	Yr	103.0	106.5	115.5	119.2	122.0	121.9	....
'35	46.6								
'36	48.2	J	105.7	101.8	113.2	118.4	120.8	121.9	122.6
'37	51.4	F	105.6	102.3	114.2	118.4	120.7	121.0	122.7
'38	51.7	M	104.8	102.3	114.4	118.4	120.8	121.3	123.2
'39	49.0	A	104.2	102.7	114.9	118.7	120.8	121.2	123.9
'40	50.1	M	103.2	105.0	115.4	119.6	121.1	121.4	124.3
'41	54.0	J	103.1	106.1	115.8	120.8	122.1	122.0	124.7
'42	61.0								
'43	64.7	J	101.9	107.7	116.1	122.0	123.1	122.0	126.0
		A	101.4	109.6	116.3	122.6	123.1	121.9	....
'44	64.4	S	101.6	110.2	117.0	123.0	123.1	122.1	....
'45	66.7								
'46	76.5	O	101.8	110.1	117.5	122.6	122.8	122.6	....
'47	93.3	N	101.8	110.4	117.6	122.5	122.9	122.4	....
'48	104.0	D	101.6	111.8	117.5	122.5	123.0	122.5	....

This is a composite of special purpose and general construction cost and price indexes weighted monthly by estimated dollar volume of construction put in place.
On some types of work two indexes are used, one special purpose for deflating, the other, available monthly, for interpolating for the months between the less frequent values of special purpose indexes.

By classes of construction the indexes used are: residential, Boeckh; industrial building, Turner—Boeckh; warehouses, office and loft buildings, Fuller—Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics—Boeckh; farm service buildings, BAE—Amer Appr; railroad, ICCRR—ENR Construction; telephone & telegraph, ICCT&T—ENRC; electric and gas utilities, Handy-Whitman—ENRC; petroleum pipeline, HW—ENRC & ICC—ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads—ENRC, Fuller—Boeckh, Turner—Boeckh; highway, BuPR—ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW—ENRC; conservation & development and all other, aver AGC—ENRC.

Current dollar volume estimates for each type of construction are deflated by the indexes indicated and the sum of all deflated segments is computed. This is divided into the estimated total of all tyoes of construction in current dollars to compute the values in the table for the Department of Commerce Composite Construction Cost Index.

No Topping-Out In Sight For The Cost Rise

Last year's prediction on construction costs still holds: "This is a situation which can erupt into a violent price movement—either up or down—but not before the Net Change curve flags the warning". This is how George H. Petit diagnoses the costs outlook.

The 30-point rise in the past year includes the third largest month-to-month increase since the volatile period of World War I, 10.5 points from July to August 1955. The two greater month-to-month rises are 13.97 points in the same months of 1954 and 15.67 points from December 1946 to January 1947.

At no time during the year has there been the slightest technical indication of a probable major decline in the index. Quite the contrary. Moreover there still is no evidence that the peak of this inflationary advance is in sight.

The clue to the positive upturn was given by the Net Change trend penetration in the 2nd quarter of 1954.

However, the Net Change curve is decreasing in intensity, like a "damped" curve in mathematics and the physical sciences. It is gradually coming to a point of dead center in its movement, caused by more frequent periods of stability in the Basic Index than have hither prevailed.

But this leads into the most difficult situation to diagnose, one that could erupt into a violent price movement up or down or that could just level off on a stable plateau. Watch the Net Change curve for its warnings.

This is what to look for in each of the three indicators:

Basic Index Curve—This shows direct monthly variations in the ENR Construction Cost Index.

Petit Trend Recognition Curve—This smooths out the monthly variations in the Basic Index Curve by using 12-month moving averages. Each quarter the high and the low of these are plotted and connected to form the blocks shown.

- The blocks measure the strength of the cost movement. They expand with increasing strength, contract as strength wanes.
- The gaps between the blocks measure the momentum. The wider the gaps the greater the momentum.
- The trend lines, set by the bottom corners on an up-movement and by the top corners on a down movement, measure the direction of the movement and sound the alert on a major change. The direction or course of the price movement is shown by the pitch of the trend lines. A major change is in progress when a block penetrates a trend line.

Momentum Net Change Curve—This measures graphically the acceleration or deceleration in change in the Trend Recognition curve. Its blocks represent the high and the low of the 3-month spread between values of the 12-month moving average.

The closest we have come to a trend reversal, since the uninterrupted rise that started in 1939, was in 1949. Note that then:

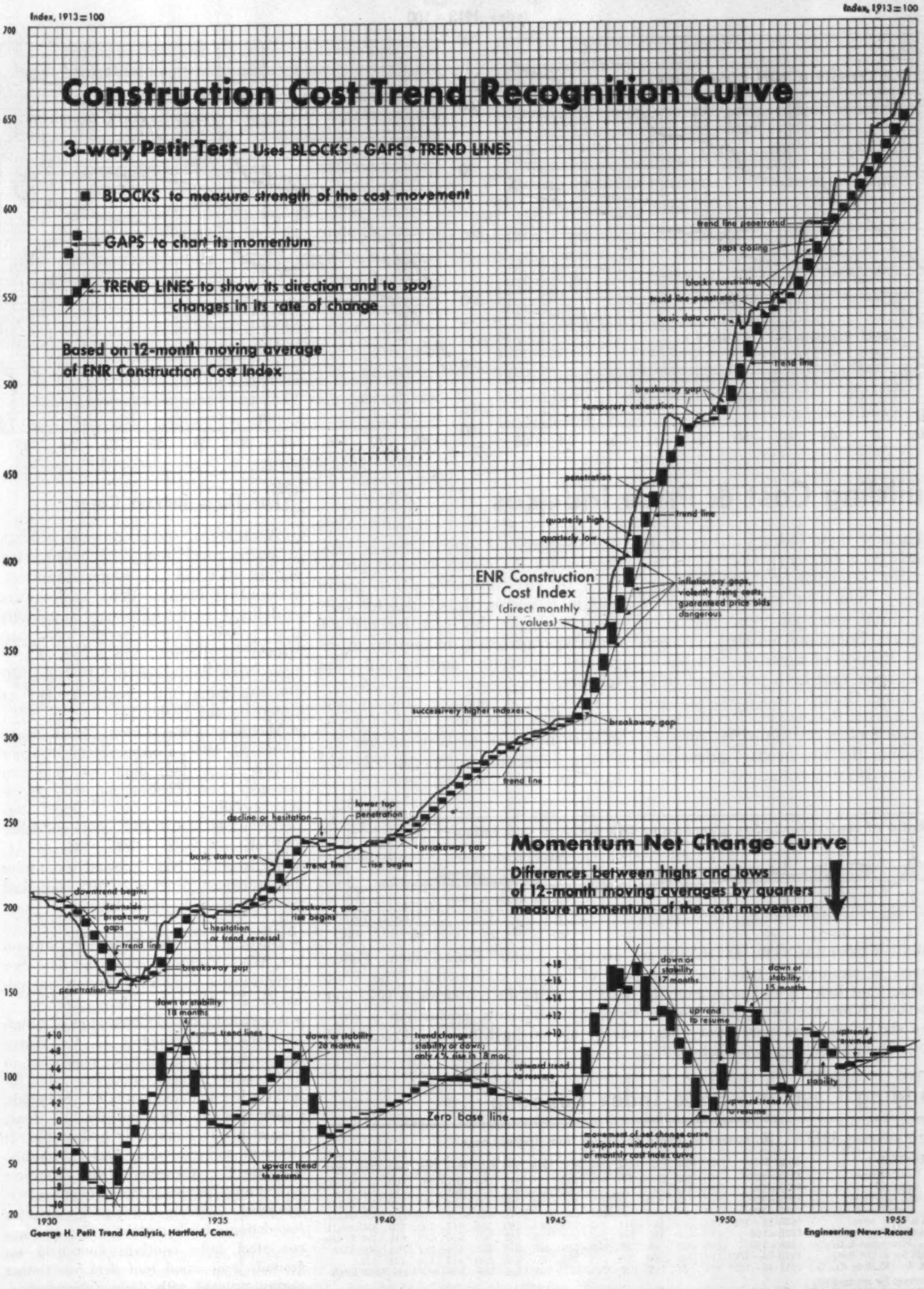
1—The Basic Index Curve crossed the Trend Recognition Curve.

2—The Trend Recognition Curve crossed and left its trend line, its blocks closed up to mere lines and its gaps closed.

3—The Momentum Net Change Curve dropped sharply almost all the way to the Zero Base Line. But it did not cross. Then a new uptrend set in.

The Basic Index Curve is the first indicator of each movement but it does not show whether the movement is temporary or lasting.

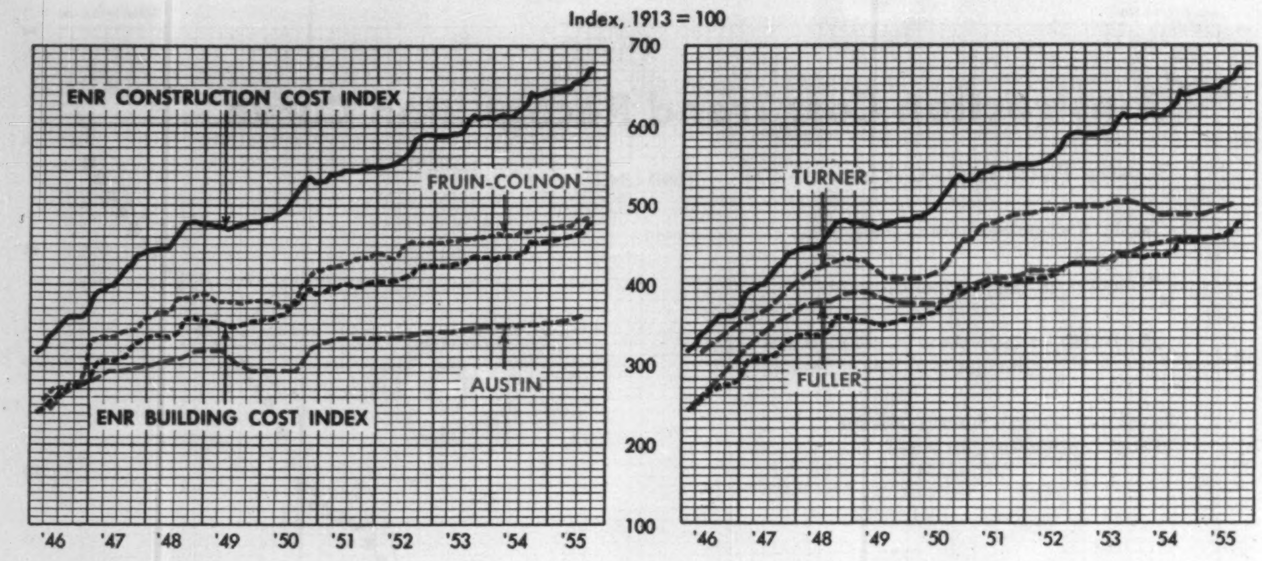
The Momentum Net Change Curve hoists the first positive signal that a new major trend is under way.



George H. Petit Trend Analysis, Hartford, Conn.

Engineering News-Record

THE CONSTRUCTION COST RISE, as predicted a year ago, picked up strength this year over last, but not with the momentum of previous upward movements. All three cost trend curves point to a continuing rise: the Basic Index Curve, in color, stays above the moving average blocks of the Trend Recognition Curve. The moving average blocks have pulled their trend line up to a steeper pitch and this has not been penetrated by a quarterly block. Finally, the Momentum Net Change Curve is again rising on the plus side of its zero base line but with less force than before.



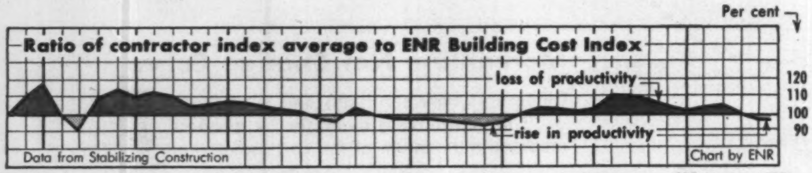
Building Cost & Price Indexes

Each of these indexes arrives at its answer by a different route. Some adjust for estimated productivity, some do not. Some are highly focused or specialized, some are more general in purpose. Some are national averages, some are local or regional.

All agree that both prices and costs are rising, though costs have been going up faster than prices. But the price indexes took a big jump this summer following the rise in steel prices and the new labor negotiations.

This price-cost squeeze may be productive for the owner but not necessarily for the contractor whose profit margin is narrowed. Contractor failures are lower this year for general building contractors, but up for other general contractors and for sub-contractors.

The special purpose indexes are plotted here on a background of ENR indexes in order to keep an eye on what is happening to this gap between basic costs and "selling" prices.



THESE CONTRACTOR INDEXES are averaged, Austin, Fruin-Colnon, Fuller, Turner, to measure the trend in selling price of building construction. The ENR Building Cost Index is used to measure the trend in cost to the contractor of labor and materials. When the selling price goes up faster than basic costs, productivity is low—when the selling price goes down while costs go up, productivity rises.—Colean and Newcomb in Stabilizing Construction.

Building Cost and Price Index Roundup

Yearly averages, 1913 = 100, converted where necessary from original base

WEIGHTED	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953	1954	1955
ENR Construction	1913=100	208	157	236	276	308	346	461	477	509	542	569	600	628	673S
ENR Building	1913=100	185	141	197	222	239	262	345	352	375	401	416	431	446	479S
American Appraisal*	1913=100	217	155	200	241	271	322	490	490	500	532	553	577	591	611Jl
Assoc. Gen. Contr	1913=100	197	171	188	209	231	257	332	342	357	377	388	408	426	443Jl
Boeckh, U. S. aver	1926–29=100	181	144	191	214	252	275	365	369	386	415	430	445	450	469Jl
Marshall & Stevens	1926=100	185	130	183	218	248	288	368	365	390	430	436	448	459	474Jn
Smith, Hinchman & Grylls*	1926=100	185	128	199	226	285	319	405	395	426	476	499	504	500	533A
ICCRR Sta & Off Bldgs	1910–14=100†	184	141	166	208	244	291	364	368	390	412	426	438	442	.....
WR & A—RC Bldg Pac Div	1911–14=100†	191	153	192	240	248	273	393	416	426	460	467	489	510	529Jl

* Correct for productivity.

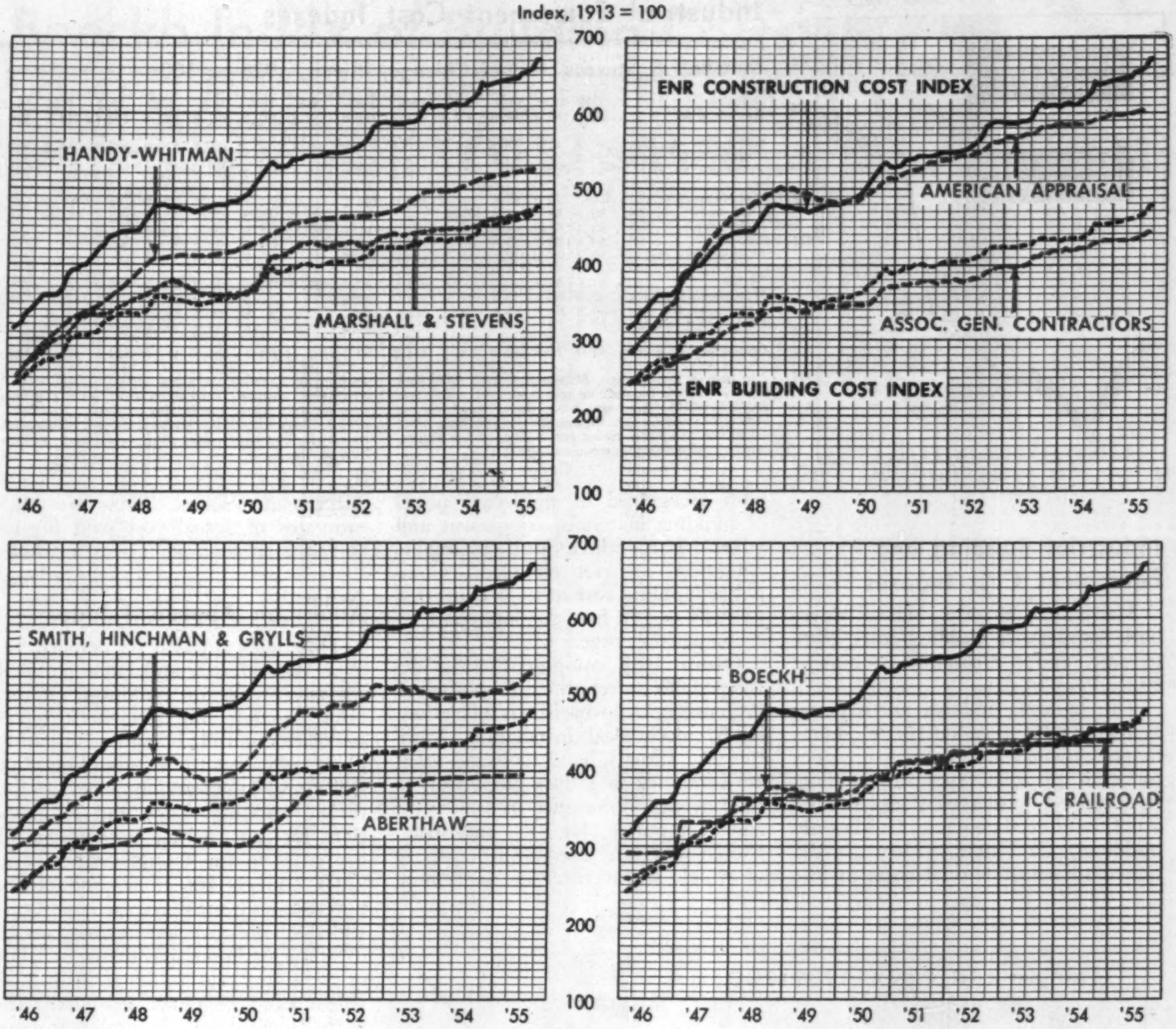
CONTRACTOR	Orig. Base	1926	1932	1939	1942	1945	1946	1948	1949	1950	1951	1952	1953	1954	1955
Aberthaw	1914=100†	197	168	190	223	236	279	321	312	321	370	381	388	394	463Jn
Austin	1926=100	185	117	152	213	234	273	317	307	313	337	342	347	352	361Jn
Fruin-Colnon	1926=100	218	178	208	227	247	285	382	382	398	433	449	460	469	486Jl
Fuller	1913=100	202	157	195	229	241	290	380	382	377	405	416	429	450	463Jl
Turner	1939=100	195	136	182	245	263	318	422	414	427	478	490	500	489	500Jl

† Not converted to 1913=100. •Jn June •Jl July •A Aug •S Sept

What These Indexes Cover

A variety of special purpose indexes is represented here. The contractor selling price indexes, appraisal indexes, accounting indexes. What each covers is defined in the following paragraphs and pages. The original bases are shown in the roundup table. These have been converted to 1913 = 100 for the table and charts, except as noted on the table.

- **Aberthaw Co., Boston, Mass.**—Since March 31, 1946, a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades. Repriced using actual and estimated labor and material costs. Before March 31, 1946, based on New England seven-story and basement, 62'4" x 202'4", reinforced concrete building built in 1914. Quarterly.
- **American Appraisal Company, Milwaukee, Wis.**—30-cities average used here. See accompanying page for definition and values for 22 cities. Monthly.
- **Associated General Contractors of America (AGC), Washington, D. C.**—Wages and materials for 12 cities combined in 40-60 ratio. Wages, prevailing rates for hod carriers and common labor. Materials, weighted: sand, gravel and crushed stone, 1; cement: 1; lumber, 1; hollow tile, ½; structural and reinforcing steel ½. Monthly.
- **Austin Co., Cleveland, Ohio.**—Reprices typical one-story, steel frame, monitor type industrial building. Includes concrete foundations; brick curtain walls; continuous steel sash; concrete floor laid on ground; 2-in. wood roof deck on timber purlins covered with 4-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler or other services. Priced for central and eastern states. Quarterly.
- **E. H. Boeckh & Associates Inc., Wash-**



ington, D. C.—20-cities average for 5 commercial and factory buildings price indexes used here. See accompanying page for definition and values for 10 classes of buildings in 21 of the 47 U S cities covered. Monthly.

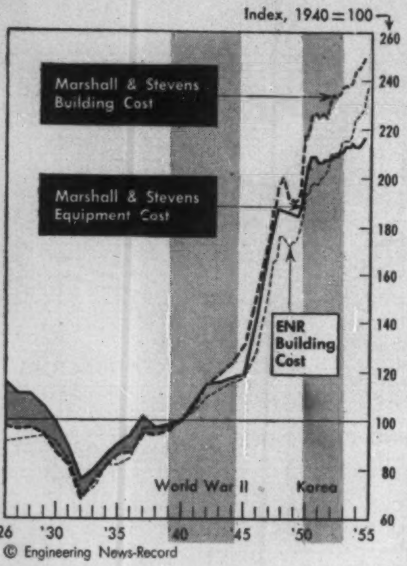
- **Fruin-Colnon Contracting Co., St. Louis, Mo.**—Industrial plant of five buildings in St. Louis repriced on basis of contractor's actual and estimated material and labor costs. Monthly.
- **George A. Fuller Co., New York, N. Y.** Composite of 36 major cost elements, in three commercial type buildings, including mechanicals, elevators, wiring, heating and ventilating, repriced. Quarterly.
- **Marshall and Stevens, Inc. of Illinois, Chicago, Ill.**—Building cost index used here. See accompanying page for its description and for industrial equipment cost indexes. Quarterly and annual for ENR.
- **Smith Hinchman & Grylls Inc., Detroit, Mich.**—Actual in-place costs, using building material costs, freight rates, skilled and unskilled labor rates and including labor efficiency and premiums, bidding competition, contractor profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting and labor procurement. Monthly.
- **Turner Construction Co., New York, N. Y.**—Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. Quarterly and special as needed.
- **Railroad Construction Cost Indexes ICC, Washington, D. C.**—Stations and office building series used here. See accompanying page for definition of this ICC analysis of major contracts. Annual.
- **Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore.**—Reinforced concrete building in the Pacific Division series used here. See accompanying page for definition and selected series values for 7 of 103 utility construction cost elements. Semi-annual.

Price-Earnings Composite Index, Building Construction

Bureau of Labor Statistics, Base 1947-49=100

By years		By months							
			1949	1950	1951	1952	1953	1954	1955
'34	44.4	Yr	103.7	110.3	119.9	121.6	126.2	128.9	....
'35	44.6								
'36	45.1	J	105.4	104.6	119.0	120.2	123.8	128.1	131.1
'37	49.6	F	105.3	105.5	119.7	120.5	124.2	128.1	131.4
'38	48.1	M	105.1	106.2	120.0	120.8	124.9	128.1	131.1
'39	48.7	A	104.5	106.4	120.0	120.9	125.3	127.8	131.5
'40	50.6	M	103.8	107.6	120.3	120.4	125.5	127.7	131.9
'41	54.4	J	103.1	108.3	120.1	120.0	125.7	127.5	131.9
'42	59.6								
'43	62.2	J	102.3	109.5	119.7	121.0	126.8	128.7	....
		A	102.2	111.6	119.6	121.8	126.9	129.3	....
'44	64.9	S	192.4	114.1	120.2	122.7	127.3	130.0	....
'45	66.9								
'46	73.8	O	102.7	115.2	120.2	123.3	127.5	130.5	....
'47	93.4	N	103.0	115.8	120.5	123.3	127.4	130.6	....
'48	103.0	D	103.8	117.6	120.2	123.5	127.9	131.1	....

This Index combines BLS Wholesale or Primary Price Index of Building Materials, weighted 61.4%, and BLS Index of Average Hourly Earnings in Building Constructon, weighted 38.6%. Weights are based on BLS studies of 1939 projects. No adjustments are made for competitive conditions, productivity or overhead.



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Industrial Equipment Cost Indexes

Marshall & Stevens, Inc. of Chicago, Illinois, 1926 = 100

Industry	1929	1932	1939	1945	1946	1947	1948	1949	1950	1952	1953	1954	6/55
Average of All	**91.9**	**66.1**	**84.8**	**103.4**	**123.2**	**150.6**	**162.8**	**161.2**	**167.9**	**180.5**	**182.5**	**184.6**	**188.1**
Commercial (av. 12*)	91.8	67.6	86.8	105.2	120.9	146.9	158.6	152.7	159.8	170.6	172.6	183.3	187.8
Transportation—garage	91.5	69.2	83.6	100.9	123.9	157.0	171.1	170.3	179.7	195.1	197.0	199.0	202.7
Public util (av. 2*)	91.8	70.1	82.9	97.5	119.5	145.8	159.6	159.7	164.8	176.6	178.8	181.7	184.4
Process (av. 9*)	90.5	73.2	83.6	103.8	123.0	149.1	161.9	161.1	166.6	178.5	180.5	183.4	186.2
Food (av 10*)	92.6	68.5	84.9	104.1	126.1	156.8	169.7	169.2	177.1	190.2	192.4	194.8	198.1
Metal working	92.3	67.9	83.6	110.7	131.2	151.3	161.8	161.8	166.9	178.6	181.0	184.1	186.9
Aircraft	93.0	66.7	85.0	109.8	127.0	162.9	178.3	177.5	186.1	201.7	203.8	205.8	210.7
Mach & parts, elec eq	92.0	68.0	83.4	106.8	130.3	156.6	167.4	167.7	175.0	189.2	191.4	194.6	197.6
Textile	91.1	67.8	83.7	101.8	122.1	146.6	157.4	157.3	165.9	193.3	198.0	199.8	202.8
Woodworking	92.0	67.2	83.6	100.9	123.0	149.6	160.4	160.4	165.5	177.1	172.3	182.3	185.1
General (av. 7*)	95.5	68.8	84.6	103.2	122.0	149.7	162.0	161.8	168.2	180.8	182.6	185.0	188.2
Cold storage—refrig	92 0	70.0	82.1	101.7	125.7	163.2	176.6	175.8	185.2	200.7	202.8	204.8	208.7
Contractors' equipment	91.0	71.9	82.4	102.5	124.2	150.3	161.1	161.1	166.2	177.8	179.9	183.0	185.8

* In each of these groups, **MARSHALL AND STEVENS** reports separate comparative equipment cost trends for: **COMMERCIAL:** Apartment, bank, church, hotel, library, restaurant, school, store, theatre, hospital, dwelling, office **GENERAL:** Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging

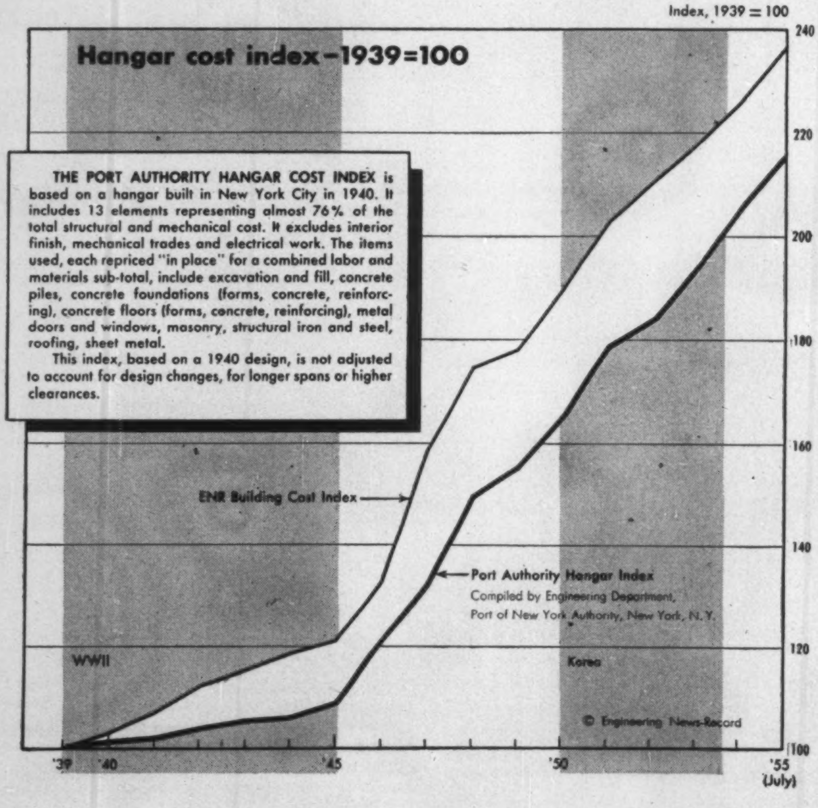
PUBLIC UTILITY: Steam power, electric power **PROCESS:** Distillery, cement, chemical, glass, petroleum industry, paint, paper, rubber, clay products **FOOD:** Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery, dairy (flour, cereal feed), packing-fruit, packing-meat

Industrial Building and Equipment Cost Indexes

Marshall & Stevens indexes cover both comparative building costs, 1902 to date, and comparative equipment costs, 1913 to date.

The building indexes are national averages with a system of modifiers to get regional and municipal values for each ot four types of building. A. Fireproof, protected steel, B. Fireproof, reinforced concrete, C. Masonry buildings, D. Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment and labor. Extraordinary or intangible conditions are not included. Composite building cost series is converted to 1913 = 100 for table and chart on accompanying page.

Comparative equipment costs, developed to cover the composite of the entire plant, machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other are combined in proper proportion to their average occurrence in each plant and computed for 47 industries. Eleven series are reproduced here, five of which are averages of 3 or more M&S related series. These are M&S estimates of actual cost paid for installed plant equipment, as a whole.



THE PORT AUTHORITY HANGAR COST INDEX is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete foundations (forms, concrete, reinforcing), concrete floors (forms, concrete, reinforcing), metal doors and windows, masonry, structural iron and steel, roofing, sheet metal.

This index, based on a 1940 design, is not adjusted to account for design changes, for longer spans or higher clearances.

American Appraisal Index

This index is based on detailed analysis of materials and labor required for four types of buildings (frame, brick, concrete and steel) in 30 representative cities. It is repriced monthly in accordance with: 1. prevailing wage scales and labor performance for the various building trades, and 2. quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions. It applies to construction only, does not include plumbing, heating, lighting, sprinklers, fixtures and decorations.

Building Cost Index

American Appraisal Co., Milwaukee, Wis.

30-cities average and 22 individual cities, 1913=100

U. S. Av., 30 cities	'26	'32	'39	'42	'45	'49	'51	'53	'54	Jul '55
	217	**155**	**200**	**241**	**271**	**490**	**532**	**577**	**591**	**611**
Boston	224	169	210	248	270	485	532	581	593	608
New York	234	170	219	248	272	503	545	594	626	629
Buffalo	219	157	205	247	279	506	551	605	619	644
Baltimore	224	166	198	248	277	510	545	585	595	609
Philadelphia	225	161	196	247	275	481	524	572	587	609
Pittsburgh	236	172	219	249	279	486	524	571	582	592
Cincinnati	217	157	209	242	272	477	508	556	571	591
Cleveland	233	160	206	245	268	485	537	577	592	609
Chicago	219	162	205	235	260	452	503	539	550	569
Indianapolis	219	157	206	247	276	501	535	584	606	631
Detroit	224	148	208	252	278	500	549	602	625	649
Milwaukee	218	144	209	254	280	493	558	609	615	630
Minneapolis	197	148	202	235	266	453	493	546	553	578
Kansas City	220	156	209	239	268	469	504	538	554	570
St. Louis	230	163	208	238	265	478	523	569	580	604
Atlanta	211	147	186	240	278	514	558	627	643	664
Dallas	204	146	171	209	246	455	483	527	533	546
New Orleans	217	145	194	234	277	501	533	589	604	626
Denver	204	149	195	226	245	441	480	518	522	541
Seattle	199	141	196	244	277	509	553	574	582	606
San Francisco	188	144	183	225	244	446	491	524	534	568
Los Angeles	195	141	167	213	249	475	517	549	556	595

Boeckh Index of Building Costs

E. H. Boeckh & Assoc., Inc., 1406 M Street, N. W., Washington, D. C.—U. S. average 1926-'29 = 100

Annual Averages By Cities	Residences Frame	Residences Brick	Apartments, Hotels, Office Bldgs. Brick and Wood	Apartments, Hotels, Office Bldgs. Brick and Conc.	Apartments, Hotels, Office Bldgs. Brick and Steel	Commercial & Factory Bldgs. Frame	Commercial & Factory Bldgs. Steel	Commercial & Factory Bldgs. Brick and Wood	Commercial & Factory Bldgs. Brick and Steel	Commercial & Factory Bldgs. Brick and Conc.
U. S. AVERAGE										
1926–29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1950	225.9	227.1	226.7	216.5	217.0	231.3	203.2	222.2	217.4	218.8
1954	250.0	255.9	255.3	256.5	252.3	254.4	243.6	254.1	259.9	263.7
June 1955	258.3	263.9	263.1	263.8	259.5	263.8	249.8	261.3	267.3	271.5
ATLANTA AREA										
1926–29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1950	196.2	194.3	194.7	185.4	191.0	199.3	183.0	190.0	185.0	183.7
1954	219.1	219.6	219.8	223.5	226.2	222.2	225.8	216.0	225.4	225.2
June 1955	224.9	224.3	224.4	227.2	230.5	229.5	229.5	220.4	229.6	220.2
BALTIMORE AREA										
1926–29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1950	231.0	231.8	232.1	215.0	216.8	234.9	204.2	230.6	217.7	216.5
1954	248.5	252.0	252.4	244.4	244.0	251.8	234.1	251.1	248.9	248.5
June 1955	253.7	256.1	256.5	246.1	246.5	257.6	236.5	253.9	251.1	249.6
BIRMINGHAM AREA										
1926–29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1950	196.3	196.1	196.8	186.6	189.4	200.6	179.2	193.9	186.2	187.6
1954	216.5	218.8	218.9	218.2	218.4	218.6	212.1	218.8	219.2	223.0
June 1955	221.6	223.7	223.8	222.7	223.0	225.1	217.5	222.5	224.4	227.5
BOSTON AREA										
1926–29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1950	234.6	237.8	236.8	227.3	225.5	240.3	210.9	231.8	229.8	232.5
1954	255.2	263.0	263.0	261.5	258.1	258.4	250.1	262.1	269.1	270.1
June 1955	266.5	273.6	273.6	272.3	268.6	271.3	260.5	271.6	280.4	281.0
CHICAGO AREA										
1926–29	109.2	114.2	109.8	113.2	100.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1950	231.9	229.7	227.4	217.8	216.8	243.4	201.2	216.5	219.5	222.6
1954	262.9	265.0	262.2	267.3	259.4	274.7	246.6	252.6	268.0	277.0
June 1955	270.4	272.1	269.3	274.2	266.6	283.0	253.4	258.6	275.2	283.9
CINCINNATI AREA										
1926–29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946	165.6	166.8	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1950	220.3	224.1	223.1	213.9	211.7	224.3	199.1	220.4	215.6	218.7
1954	247.9	256.8	255.5	257.9	250.1	251.0	239.9	258.6	260.5	267.7
June 1955	255.7	264.8	263.4	266.3	257.7	259.7	246.5	266.6	269.3	276.8
CLEVELAND AREA										
1926–29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1950	237.9	237.8	235.4	227.8	224.1	248.1	207.2	227.6	228.4	232.3
1954	264.8	270.3	268.0	271.9	263.2	274.6	251.6	263.4	276.1	282.1
June 1955	275.3	281.6	278.9	282.5	272.6	285.7	259.2	274.5	286.5	293.6
DALLAS AREA										
1926–29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.6	141.1
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1950	220.5	221.2	222.1	209.0	212.5	221.3	206.3	218.6	210.1	208.3
1954	235.6	237.6	239.0	237.4	235.3	237.4	246.7	236.0	245.4	238.7
June 1955	239.0	240.9	241.8	241.4	243.1	242.4	249.7	237.8	248.9	243.2
DENVER AREA										
1926–29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946	160.1	160.3	150.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1950	228.2	230.0	229.8	218.8	221.2	232.4	212.3	226.2	221.2	221.3
1954	252.0	258.9	258.6	259.1	257.1	254.3	252.8	259.3	263.4	266.2
June 1955	262.4	267.9	267.2	266.1	264.1	265.9	257.1	266.2	269.6	273.2
DETROIT AREA										
1926–29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1950	233.0	234.0	233.3	222.8	222.0	240.0	208.1	227.1	226.0	225.7
1954	262.8	269.2	267.7	271.4	264.0	270.5	253.6	264.0	276.1	281.0
June 1955	273.3	279.9	278.0	281.4	272.3	282.5	261.1	273.7	286.1	292.4
KANSAS CITY AREA										
1926–29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1946	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	159.3	160.3
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1950	230.5	229.6	228.7	216.0	218.8	238.1	203.6	219.6	217.7	217.8
1954	255.5	260.7	260.2	257.1	253.8	261.3	244.6	256.6	260.5	266.6
June 1955	261.8	266.7	265.8	263.3	260.3	269.0	251.0	261.5	267.6	272.1
LOS ANGELES AREA										
1926–29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1946	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	158.7
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1950	222.8	224.1	223.4	217.4	219.2	227.8	205.5	215.4	217.5	219.0
1954	245.3	251.0	250.0	257.7	254.9	251.0	249.8	245.3	261.8	265.7
June 1955	258.6	264.0	262.6	270.3	265.8	265.8	258.8	256.6	273.0	279.2
MINNEAPOLIS AREA										
1926–29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946	163.7	167.0	167.5	156.5	155.7	164.9	142.6	168.2	157.2	159.5
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1950	228.2	227.9	227.0	210.1	213.2	234.4	198.2	220.3	215.6	211.3
1954	256.1	263.6	262.8	257.1	253.4	259.8	242.1	264.3	261.7	266.1
June 1955	266.2	273.5	272.3	267.6	263.1	270.7	249.6	272.5	271.4	277.3
NEW ORLEANS AREA										
1926–29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946	148.9	147.7	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1950	211.7	210.3	211.0	196.2	203.1	215.8	194.4	206.4	199.5	195.3
1954	231.0	233.1	233.7	228.9	233.2	234.3	225.2	232.1	232.8	231.5
June 1955	237.6	239.8	240.2	237.1	240.7	241.7	232.1	238.0	240.2	238.9
NEW YORK CITY AREA										
1926–29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.0
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1950	254.5	256.2	255.2	249.5	246.1	262.1	224.2	249.7	248.0	251.5
1954	278.2	285.0	284.3	293.0	284.5	284.6	271.3	280.7	295.4	300.6
June 1955	283.7	290.6	289.6	295.3	286.7	289.9	271.9	286.7	297.0	303.6
PHILADELPHIA AREA										
1926–29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1946	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1950	234.4	235.1	234.8	221.2	220.7	239.3	202.0	230.5	218.8	222.8
1954	261.9	268.0	267.1	264.4	258.0	265.2	238.9	268.0	262.0	271.1
June 1955	271.8	277.6	276.7	272.2	265.2	276.0	245.8	276.9	270.5	279.1
PITTSBURGH AREA										
1926–29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1950	237.6	238.6	237.6	222.2	219.8	242.6	196.6	235.3	218.9	224.2
1954	263.9	270.6	269.6	264.5	258.2	267.8	238.9	271.4	265.0	271.4
June 1955	271.0	277.2	275.9	269.5	263.1	275.8	243.3	276.8	269.8	276.1
ST. LOUIS AREA										
1926–29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1950	230.7	232.8	233.7	221.9	220.9	240.1	204.7	229.5	222.8	225.3
1954	257.9	264.6	263.4	263.7	256.8	263.6	244.8	263.1	266.2	273.3
June 1955	267.4	274.0	272.9	272.2	265.3	274.1	252.2	272.5	276.0	281.8
SAN FRANCISCO AREA										
1926–29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1950	223.1	227.0	226.8	222.4	222.9	226.1	209.1	224.5	222.6	224.5
1954	249.2	257.4	256.6	264.1	259.3	253.0	250.4	256.7	267.2	272.5
June 1955	261.9	270.2	269.2	275.8	269.6	267.5	259.9	269.2	278.8	286.1
SEATTLE AREA										
1926–29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946	152.9	158.3	157.9	161.2	159.8	154.3	156.0	158.9	164.2	167.1
1949	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1950	213.6	224.1	224.0	227.1	224.7	214.3	214.1	227.8	230.3	234.5
1954	236.1	253.3	253.2	266.6	259.5	234.6	253.5	262.6	274.0	279.1
June 1955	243.7	260.3	260.3	272.5	265.7	242.9	259.7	268.5	280.5	285.2
WASHINGTON, D. C.										
1926–29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1946	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	156.6
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1950	235.0	233.7	233.8	223.2	224.5	240.5	210.2	227.5	223.8	222.0
1954	254.4	256.6	257.4	255.4	253.2	260.2	245.3	252.7	259.4	260.0
June 1955	262.2	263.3	264.0	260.2	258.6	269.2	250.5	258.0	264.6	264.3

Current indexes are calculated upon an actual survey at source of local construction cost conditions. Material prices used are those paid by contractors to material dealers.

Labor rates are current rates paid by contractors — certain corrections being made in certain areas for labor efficiency and labor shortage. Index includes construction overhead sales taxes, compensation insurance and social security. The indexes have been primarily, engineered to use as local cost conversion factors to construction cost data released by the Boeckh organization. Complete formula is published in "Boeckh's Index Calculator Table."

Where Boeckh index is shown in these pages on charts or tables for comparison with other building cost indexes, the "National" average for all five Boeckh commercial and factory buildiing indexes in 20 (of 47) U. S. cities is used, converted to 1913 = 100.

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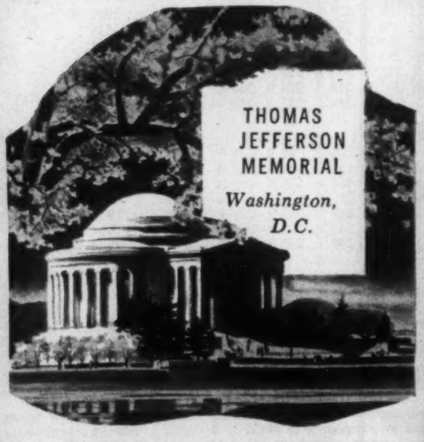
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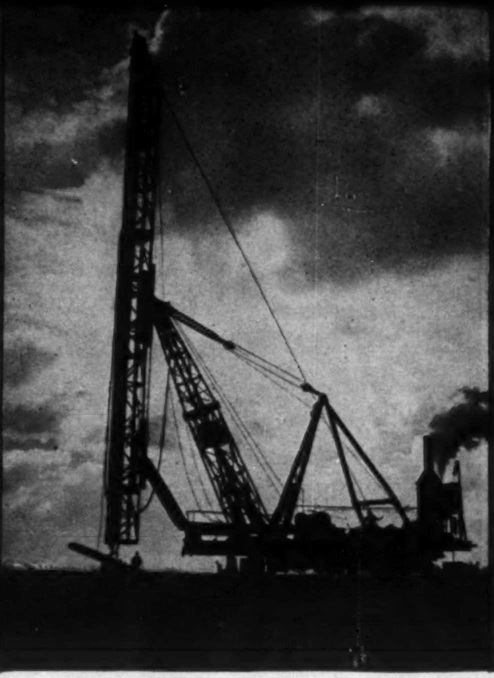

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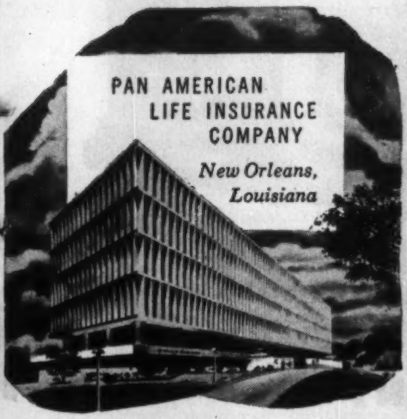
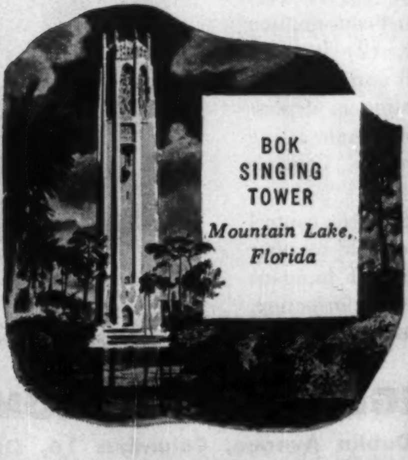
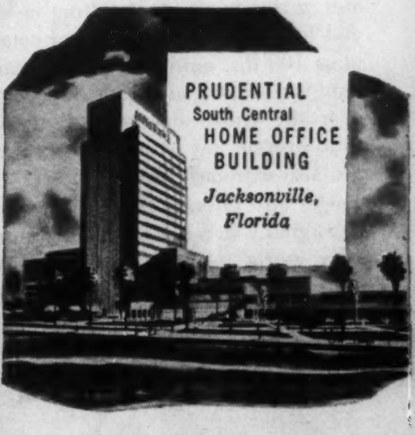


PAN AMERICAN LIFE INSURANCE COMPANY
New Orleans, Louisiana



BOK SINGING TOWER
Mountain Lake, Florida



PRUDENTIAL South Central HOME OFFICE BUILDING
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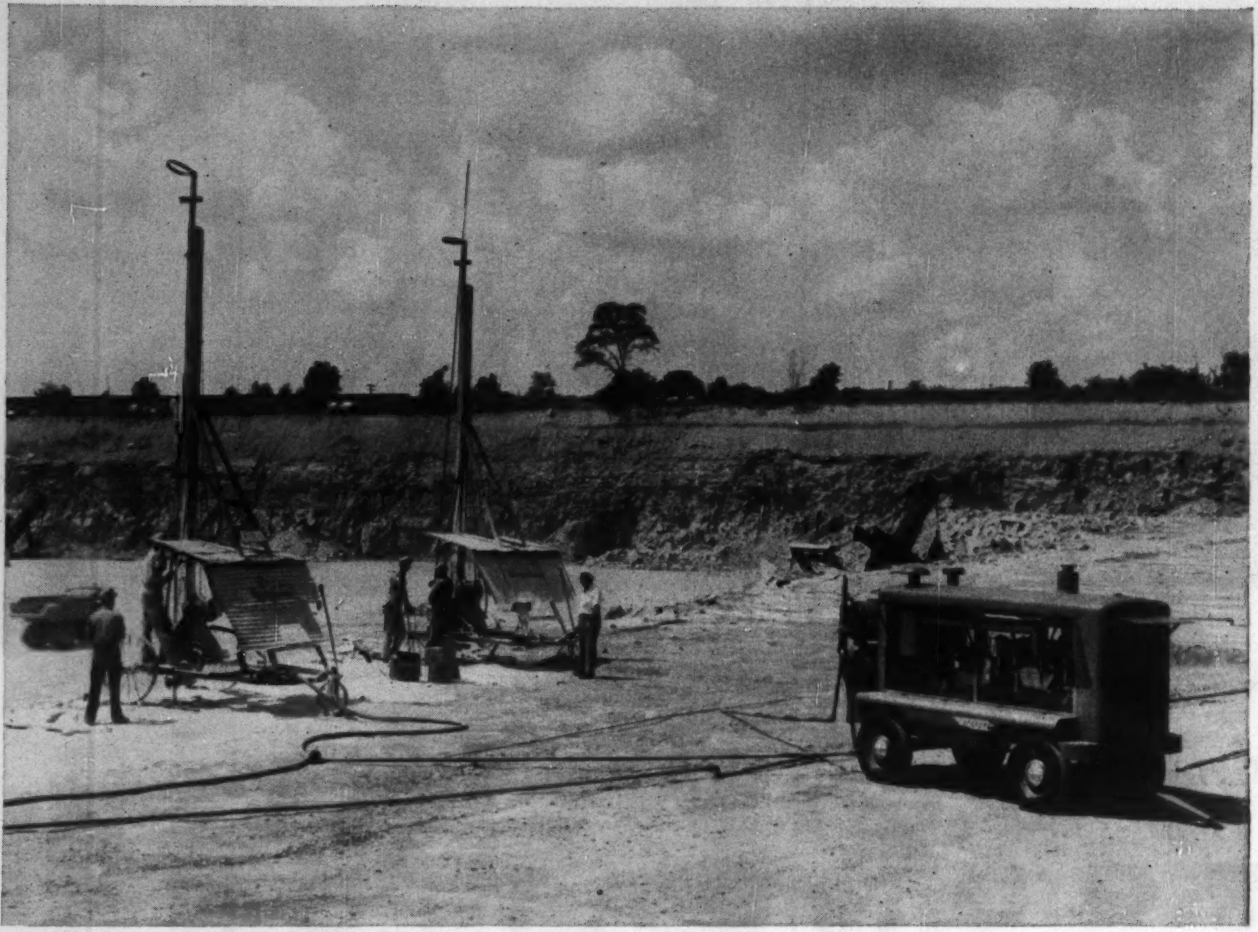

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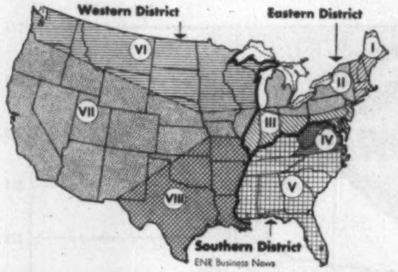


Railroad Cost Index Road Construction

Interstate Commerce Commission —1910-14 = 100

Dist & Reg.	%	1926	1932	1939	1945	1949	1953	1954
1 to VIII	68.40	166	131	137	197	270	319	320
I East	73.72	173	134	140	206	287	333	332
II East	66.47	168	133	141	202	283	330	333
III East	65.37	168	132	144	205	286	335	334
IV South	63.48	163	126	131	195	259	310	311
V South	68.79	164	129	136	195	265	315	317
VI West	72.27	164	129	132	190	253	307	309
VII West	68.79	166	131	133	188	256	306	308
VIII West	71.97	167	133	140	198	270	316	321

Indexes represent territorial index factors and are not for determining unit reproduction costs for individual roads.

By Accounts	1926	1932	1939	1945	1949	1953	1954
Engineering	166	131	137	197	270	319	320
Other rt of way exp.	159	121	135	201	258	309	281
Grading	153	106	90	144	139	154	144
Tunnels & subways	178	119	140	236	339	379	367
Brdg. culv & trestl.	170	122	149	240	374	434	418
Elevated structures	165	129	149	249	382	468	450
Ties	173	144	158	241	302	358	360
Rails	144	140	136	152	245	311	326
Other track material	177	163	167	176	278	331	351
Ballast	175	146	143	181	254	288	312
Trk laying & surf	188	164	165	273	366	427	443
Fences snw sheds	178	147	140	189	279	343	340
Stat & off bldgs	184	141	166	244	368	438	442
Roadway buildings	187	140	162	258	386	439	443
Water stations	182	147	166	227	327	379	384
Fuel stations	180	144	159	242	357	415	421
Shops & eng houses	185	137	165	248	379	446	450
Grain elevators	190	137	164	236	367	437	440
Storage warehouses	189	137	166	253	377	452	458
Wharves & docks	177	136	153	255	350	404	402
Coal & ore, wharves	174	136	153	236	341	395	388
Tel & tel lines	157	121	129	173	250	315	317
Sgnls & intrlocks	169	130	143	176	226	290	296
Power plants	186	138	167	246	386	472	477
Powr trnsmissn sys.	176	143	148	180	266	331	338
Misc struct	186	141	161	229	378	445	449
Roadway mach	151	138	154	187	270	332	333
Roadway small tools	190	155	180	200	315	400	416
Public impr const	169	131	142	217	321	358	347
Shop mach	186	155	202	236	324	387	386
Power plant mach	186	155	180	191	242	297	300
Work equipment	180	165	200	254	348	422	427

Ratio of RR costs, 1954

Road construction	66.66
Equipment, work	0.54
Equipment, rolling & floating	26.38
General	6.42
Total	100.00

Indexes released August 1955, by Engineering Sect. Bu. of Accounts, Cost Finding and Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various sub-committees of President's Conference Committee, engineering publications, contracts covering major construction projects and information furnished by individual carriers.

Handy-Whitman Index—Public Utility Costs

Whitman, Requardt and Associates, Baltimore, Md.

Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually. Weighting is based on wide experience in cost analysis of plants and construction. Material prices are from ENGINEERING NEWS-RECORD, Iron Age and various manufacturers; labor rates from BLS, unions and builders associations.

Building construction—1911 to 1914 = 100

(Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	213	213	171	159	205	207	250	253	259	260	436	433	437	448	479	485	496	519	526	534	540	547
B	228	229	189	173	211	214	246	250	262	265	429	421	424	436	474	479	485	503	511	523	525	527
South Atlantic Division																						
A	213	215	171	164	204	205	260	267	274	275	462	453	465	469	510	517	527	556	562	569	578	587
B	226	228	185	176	209	211	255	262	272	277	431	431	434	439	485	488	494	516	524	536	543	551
North Central Division																						
A	203	201	169	154	200	200	237	242	249	253	421	418	423	437	468	481	492	520	519	526	533	542
B	212	211	181	164	203	203	229	234	248	250	389	390	394	408	440	453	459	483	487	497	503	513
South Central Division																						
A	192	191	149	144	188	187	232	236	242	243	411	412	418	422	454	460	471	494	499	504	508	515
B	203	204	160	154	191	191	223	227	235	238	382	382	387	392	424	438	445	460	466	474	478	486
Plateau Division																						
A	198	197	153	149	194	194	230	235	238	239	402	397	400	417	451	456	471	480	479	495	499	506
B	211	210	167	163	199	200	221	227	231	233	396	395	396	410	442	447	458	464	465	481	485	492
Pacific Division																						
A	191	190	157	148	192	192	238	241	248	248	416	415	420	432	463	468	477	501	501	518	524	529
B	198	197	164	156	193	193	226	231	241	242	386	385	389	400	435	443	448	466	465	479	488	498

Gas plant construction—1911 = 100

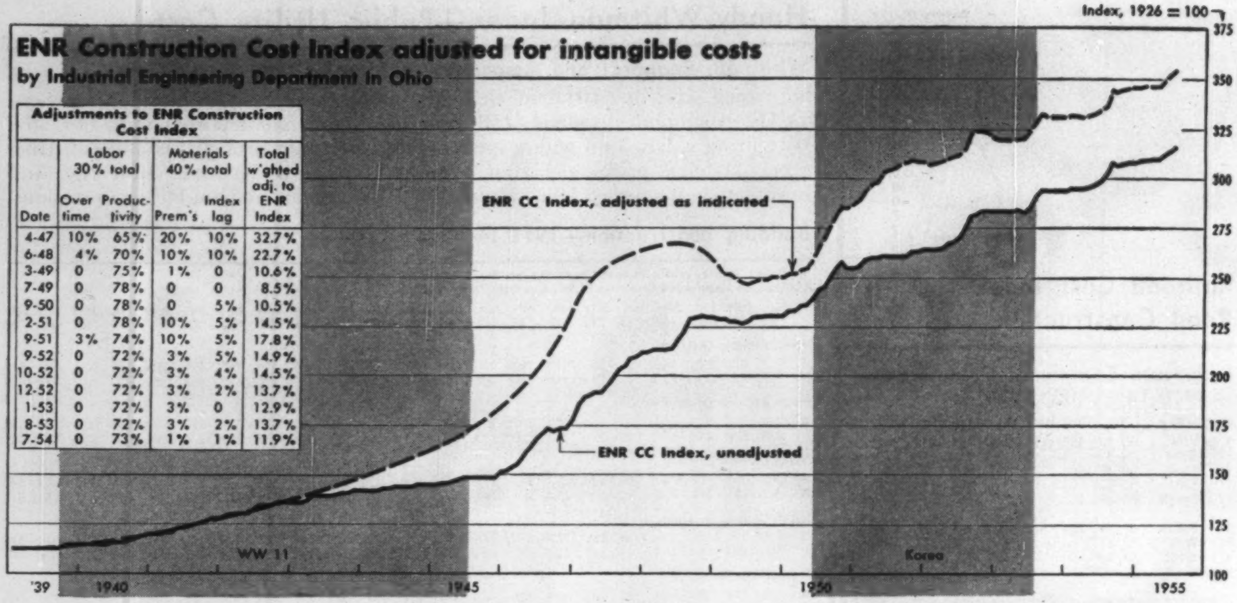
(Complete Index reports 25 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	230	230	202	188	241	249	272	275	283	288	469	464	467	476	519	536	540	561	577	589	600	605
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
South Atlantic Division																						
A	219	222	178	175	227	230	261	268	278	282	464	453	456	457	507	520	525	543	560	568	581	591
B	212	212	209	195	274	278	297	299	296	301	481	482	479	485	549	554	567	590	606	609	615	615
North Central Division																						
A	217	218	198	178	232	232	249	254	264	269	435	434	437	447	489	503	508	531	545	554	565	572
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
South Central Division																						
A	199	200	171	160	216	217	244	249	258	261	420	419	425	429	470	475	479	496	510	522	532	538
B	212	212	209	195	274	278	297	299	296	301	447	487	479	485	549	554	567	590	606	609	615	615
Plateau Division																						
A	202	202	176	166	216	217	232	237	240	243	403	398	401	405	449	460	467	476	489	501	511	517
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615
Pacific Division																						
A	205	206	187	177	227	228	253	257	264	266	433	428	433	437	480	494	498	516	529	544	555	561
B	212	212	209	195	274	278	297	299	296	301	447	481	479	485	549	554	567	590	606	609	615	615

Electric light and power construction—1911 = 100

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs.)
A relates to Total Constr. & Equip. All Steam; B to Accessory Electric Equipment; C to Sub-sta. Equip.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	Jan. '45	July '45	Jan. '49	July '49	Jan. '50	July '50	July '51	July '52	Jan. '53	July '53	Jan. '54	July '54	Jan. '55	July '55
North Atlantic Division																						
A	197	194	182	176	224	225	248	248	251	259	401	400	399	409	468	480	481	506	509	517	519	524
B	197	196	192	186	225	224	241	239	226	237	340	341	341	360	420	430	426	457	457	460	461	468
C	184	178	172	168	203	203	217	216	207	218	306	312	312	320	359	366	365	392	392	396	396	400
South Atlantic Division																						
A	201	201	188	180	232	233	262	267	268	273	430	422	422	430	490	504	506	536	539	547	551	559
B	200	203	200	191	239	240	260	262	247	248	357	356	358	374	431	442	438	474	474	482	485	494
C	187	183	180	173	217	218	235	237	227	228	322	325	327	333	370	377	377	409	409	417	419	425
North Central Division																						
A	190	187	186	174	219	218	235	238	238	243	375	374	374	382	443	456	458	489	488	495	498	504
B	189	188	199	186	224	223	229	231	216	218	309	307	310	324	382	391	388	419	418	424	425	432
C	178	171	181	169	203	202	207	209	198	200	278	280	282	286	326	333	332	359	359	364	365	369
South Central Division																						
A	184	183	179	171	218	218	245	246	248	251	391	390	390	398	454	465	468	496	498	506	508	515
B	187	189	200	190	231	230	250	248	235	235	341	340	340	357	415	423	420	453	454	460	462	470
C	175	171	181	173	210	209	226	226	217	217	310	311	311	319	352	356	356	385	386	392	394	398
Plateau Division																						
A	190	188	177	171	218	219	234	236	238	241	378	378	376	386	443	454	460	482	484	493	495	500
B	197	196	194	188	231	232	237	236	225	225	322	323	323	341	399	408	407	437	435	440	441	446
C	185	177	175	171	209	211	213	212	207	207	289	294	294	302	341	347	348	374	374	378	378	381
Pacific Division																						
A	180	178	172	163	216	215	235	242	242	244	383	380	379	389	450	459	461	486	487	495	499	503
B	178	177	182	170	222	222	231	240	225	225	328	323	323	343	408	413	409	437	436	438	440	447
C	167	161	164	155	203	202	210	219	208	208	298	297	297	307	357	359	358	382	382	384	385	390

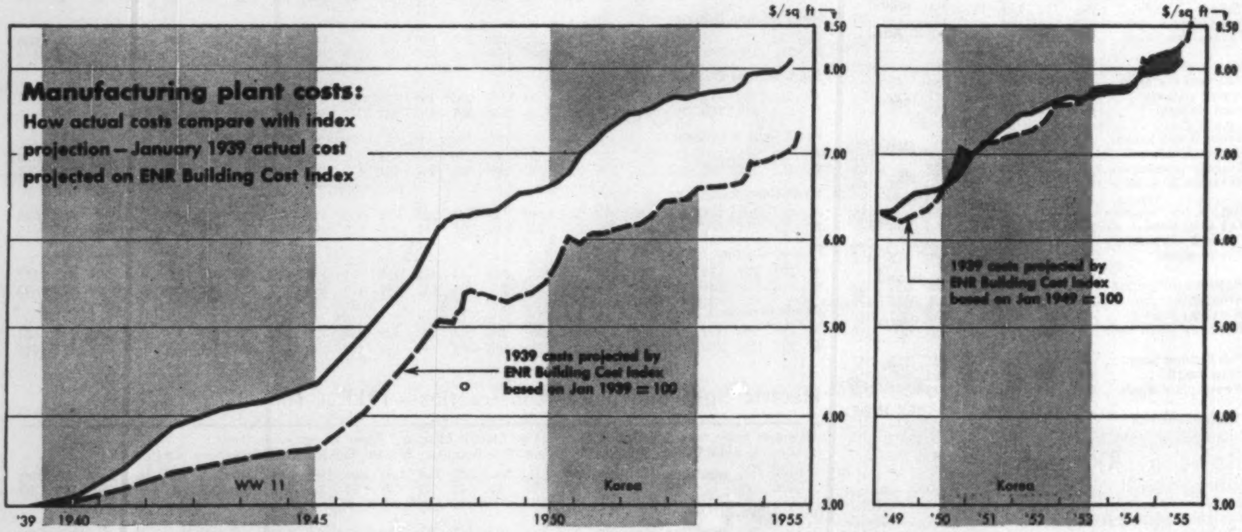


Adjustments to ENR Construction Cost Index

Date	Labor 30% total Over time	Labor 30% total Productivity	Materials 40% total Prem's	Materials 40% total Index lag	Total w'ghted adj. to ENR Index
4-47	10%	65%	20%	10%	32.7%
6-48	4%	70%	10%	10%	22.7%
3-49	0	75%	1%	0	10.6%
7-49	0	78%	0	0	8.5%
9-50	0	78%	0	5%	10.5%
2-51	0	78%	10%	5%	14.5%
9-51	3%	74%	10%	5%	17.8%
9-52	0	72%	3%	5%	14.9%
10-52	0	72%	3%	4%	14.5%
12-52	0	72%	3%	2%	13.7%
1-53	0	72%	3%	0	12.9%
8-53	0	72%	3%	2%	13.7%
7-54	0	73%	1%	1%	11.9%

Addition to General Purpose Index Converts it to a Special Purpose Index

To adapt a basic general purpose cost index to its needs, a big industrial company in Ohio superimposes on the Engineering News-Record Construction Cost Index an additional component to cover the "invisible" or "intangible" costs described above. The method used is shown in the accompanying chart.



Walter Kidde Constructors, New York, N. Y

Manufacturing Plant Cost Index—1939=$3/sq ft

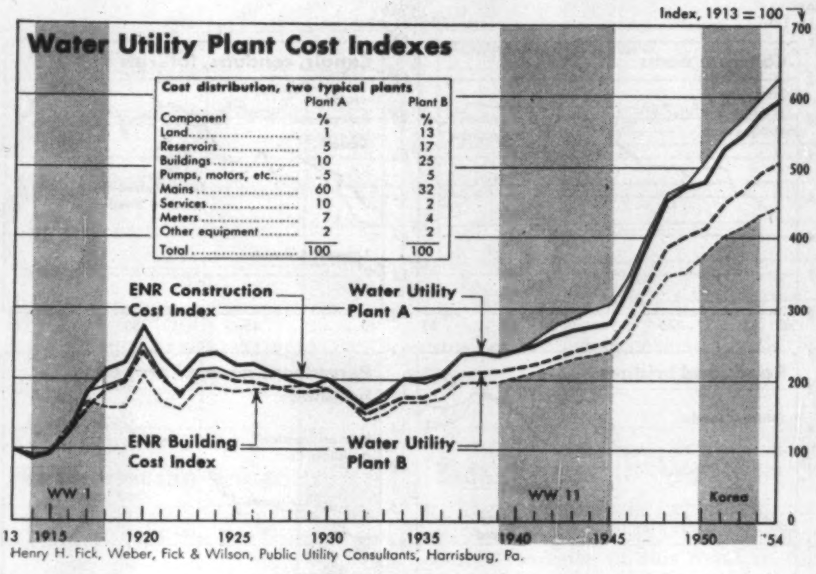
This special purpose cost index is based on the unit "actual cost," $3 per sf in 1939, of an average standard manufacturing plant. Every plant built has its own characteristics which affect its cost, thus cost estimates or accounts for different plants do not measure accurately the direction and degree of cost and price movements.

So the same plant is repriced here to represent experience in the metropolitan New York and New Jersey areas. Costs include overhead, insurance, taxes, overtime, construction equipment use and other "invisible" costs that must be covered in the selling price. Holding these to a minimum, plus shrewd buying, good labor relations and direction are functions of management and "productivity."

To test the effects of these "invisibles" on actual costs, the 1939 base price has been projected by use of the Engineering News-Record Building Cost Index which measures only the trend in cost of labor and materials.

Note in the chart at the right how improved productivity is pulling the actual costs across and below the curve that measures the movement in materials prices and wage rates including fringe benefits. The highly competitive situation in 1954 should hold this actual cost curve below the building cost index projection.

This "actual vs. theoretical" cost comparison is made available by E. Warren Bowden, vice president, Walter Kidde Constructors, Inc., New York.



Cost distribution, two typical plants

Component	Plant A %	Plant B %
Land	1	13
Reservoirs	5	17
Buildings	10	25
Pumps, motors, etc.	5	5
Mains	60	32
Services	10	2
Meters	7	4
Other equipment	2	2
Total	100	100

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.

Indexes Used to Develop Fick Waterworks Property Component Cost Indexes

	Indexes, 1913=100								
Building	1926	1932	1939	1940	1949	1953	Dec. 1953	1954	Dec. 1954
Engineering News-Record Building Cost Index	185.0	140.9	197.4	202.8	351.8	430.9	435.9	445.7	456.8
E. H. Boeckh & Assoc brick & concr comm & factory bldg, Pittsburgh, Pa area	210.3	161.7	223.9	224.2	413.2	495.3	507.9	510.2	514.1
ICC Railroad constr index, station & office buildings, Group III (1910–14=100)	184.0	141.0	166.0	177.0	368.0	438.0	.....	.....	.....
Handy-Whitman brick buildings index, North Atl. Div.	229.0	175.3	214.0	218.3	423.8	500.5	511.0	520.5	525.0
Materials									
6-in & larger cast-iron pipe, based on Iron Age Index, New York City	215.0	130.1	213.1	223.4	421.3	491.0	494.2	494.2	494.2
3-in & under steel pipe, private sources*	187.5	171.9	155.4	155.4	249.7	313.6	322.0	328.0	334.3
Motors, based on Handy-Whitman Index, North Atlantic Div.	134.2	134.0	147.8	147.0	232.0	308.5	317.0	317.0	317.0
Contractors' equipment, based on Marshall & Stevens Index	158.7	114.1	130.8	132.4	255.7	282.2	290.8	290.5	289.7
Office equipment, based on Marshall & Stevens Index.	136.8	101.1	123.5	127.2	220.9	251.0	252.3	252.7	252.3
Meters, private sources	162.5	162.5	147.7	147.7	265.9	317.7	332.7	332.7	332.7
Common Labor, based on Engineering News-Record labor index, 20-city average	288.4	224.7	359.5	367.9	763.2	985.3	1,017.4	1,044.2	1,064.2
Construction, based on Engineering News-Record Construction Cost Index	208.0	157.0	235.5	242.0	477.0	600.1	611.5	628.0	643.3
Gas utility costs, based on Handy-Whitman Index North Atlantic, Div	212.0	174.5	229.6	235.2	432.9	518.3	534.3	545.2	555.6

* Replaces wrought iron pipe in the SERVICES INDEX 1913 to date (see table, upper right)

Petroleum Refinery Construction Cost Index

Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant, published by Oil & Gas Journal, Tulsa, Oklahoma—1946 = 100

	1926	1932	1939	1942	1945	1948	1949	1950	1951	1952	1953	1954	June 1955
NELSON Refinery Construction Index=1946=100	*72.0	*56.6	*76.6	*83.7	*89.9	132.5	139.7	146.2	157.2	163.6	173.5	179.8	182.1
EQUIPMENT													
Heat exchangers	75.0	60.0	76.0	93.5	91.9	130.0	133.0	140.0	152.0	165.8	174.9	171.7	153.4
Instruments (control)	....	90.0	89.5	85.5	90.6	120.0	122.0	127.8	142.3	146.2	151.8	154.6	162.9
Pumps, compressors, etc.	....	....	91.5	87.5	93.9	127.0	135.9	138.2	155.9	155.6	162.5	166.5	170.4
Electrical equipment	81.0	57.0	68.5	74.0	81.8	127.6	130.9	134.9	154.3	152.4	156.4	160.0	160.3
Internal combustion engines	....	....	84.5	84.5	91.7	116.9	124.8	126.0	146.1	146.5	148.1	150.5	149.9
Miscellaneous equipment average	*94.0	*79.0	*82.0	*85.0	*90.0	†122.1	†121.6	†126.2	†145.1	153.3	158.8	160.7	159.4
MATERIALS	....	68.0	82.0	86.3	89.7	139.3	143.6	149.5	164.0	164.3	172.4	174.6	171.2
LABOR	....	49.0	73.0	82.0	90.0	128.0	137.1	144.0	152.5	163.1	174.2	183.3	189.3

* Approximate, projection back to these dates from other cost sources.
† Used to compute index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown

Equipment prices, mainly from manufacturers as quoted to Oil & Gas Journal *Materials Component from Bureau of Labor Statistics Wholesale Price Index, Code 10-1 Iron and Steel and Code 13, Building Materials *Labor, half skilled and half common labor as quoted by Engineering News-Record. For base costs see ENR Oct. 8, 1953. p. 115

Waterworks Property Cost Index Components—1913=100

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.

Year	Reservoirs	Buildings	Pumps and Motors	Distribution System	Services*	Meters	Other Equipment
1926	208.0	210.3	134.2	237.0	230.9	175.0	147.0
1932	157.0	161.7	134.0	158.5	194.6	168.7	107.1
1939	235.5	223.9	147.8	257.0	243.2	168.8	126.9
1940	242.0	224.2	147.0	266.8	246.8	169.7	129.7
1941	257.8	229.9	147.0	273.7	256.8	189.8	140.0
1942	276.3	239.8	154.0	283.3	270.6	201.9	151.6
1943	289.9	247.9	154.0	291.1	281.6	204.5	152.5
1944	298.7	261.8	145.8	295.2	287.5	205.9	154.4
1945	307.7	278.2	148.2	300.1	294.5	207.5	155.9
1946	346.0	298.7	173.8	358.5	329.9	222.5	185.1
1947	413.2	341.0	210.0	428.8	385.2	235.6	225.3
1948	460.7	394.9	218.8	504.7	439.5	288.9	242.2
1949	477.0	413.2	232.0	523.8	470.5	315.6	237.0
1950	509.1	421.4	251.2	520.1	496.4	336.4	246.3
1951	542.0	448.1	297.0	581.3	528.3	364.5	249.0
1952	568.8	467.1	296.5	605.3	559.6	370.7	248.8
1953	600.1	495.3	308.5	639.3	602.5	384.4	265.7
Dec. 1953	611.5	507.9	317.0	651.2	621.0	401.1	270.3
1954	628.0	510.2	317.0	659.3	636.0	403.8	270.4
Dec. 1954	643.3	514.1	317.0	665.3	648.2	405.8	269.7

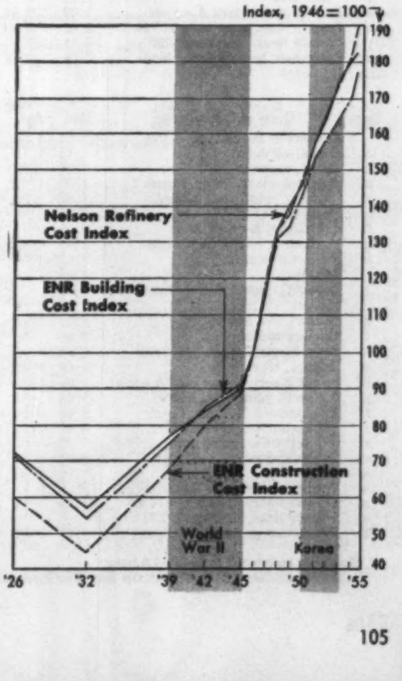
* Revised—steel pipe substituted for wrought iron pipe 1913 to date based on 3-in. & under diam. steel pipe.

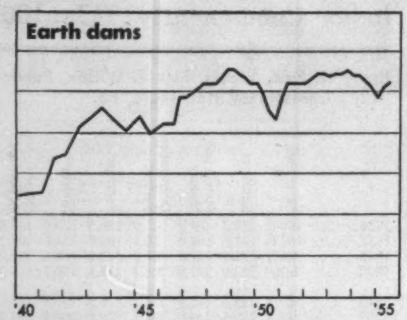
These special purpose indexes, tailored to fit individual waterworks properties, are compared here with the ENR general purpose cost indexes together with an illustration of how two properties can vary in cost trends depending on the ratio of treatment plant and other buildings to supply and distribution system.

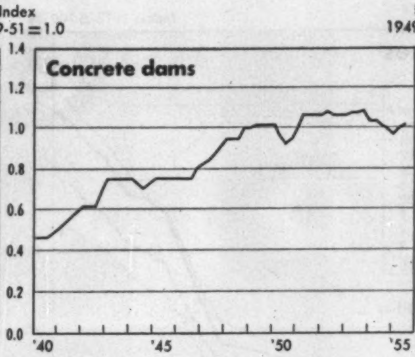
For more detail on the purpose and construction of these indexes see ENR Oct. 8, 1953, p. 113.

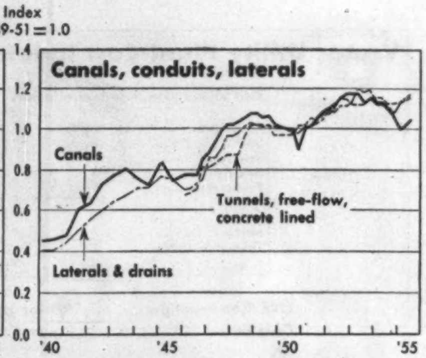
Nelson Refinery Cost Index

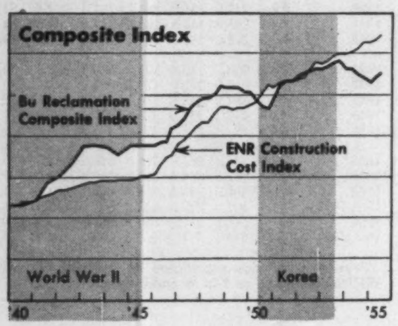
This index applies to the costs of constructing refinery and natural gasoline plants since 1946, projected back to 1926. For more detail see ENR Oct. 8, 1953, p. 115.

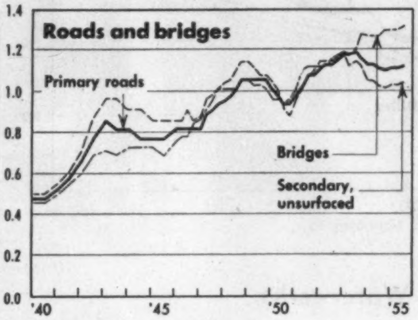


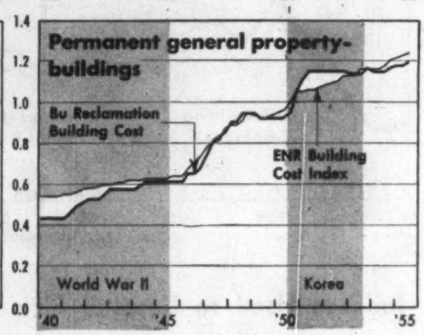












Irrigation and Hydro-power Construction Cost Indexes—1949–51 = 1.0

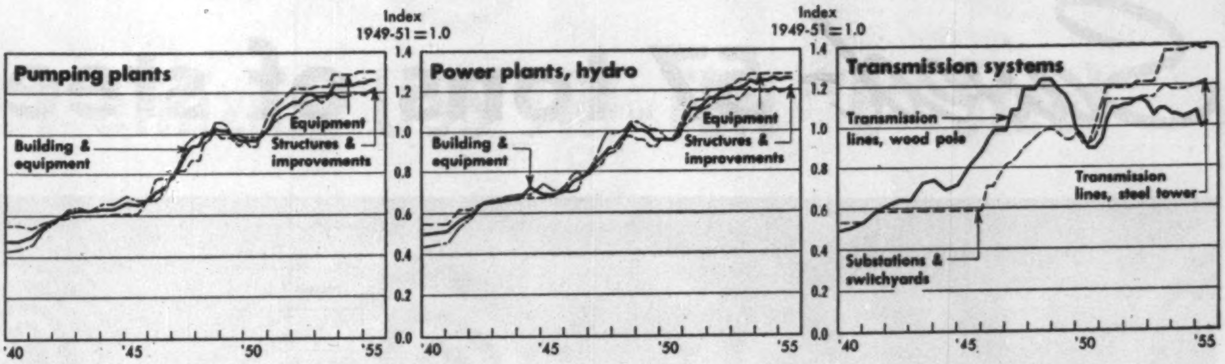
U. S. Bureau of Reclamation, Office of Assistant Commissioner and Chief Engineer, Denver, Colo.

Item	Class of Construction	Conv. fact*	1940		1941		1942		1943		1944		1945		1946			
			Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	July	Jan.	Apr.	July	Oct
	Composite Index	2.12	**0.47**	**0.47**	**0.49**	**0.57**	**0.61**	**0.67**	**0.75**	**0.76**	**0.75**	**0.72**	**0.76**	**0.76**	**0.76**	**0.77**	**0.87**	**0.84**
a	Dams, earth	2.00	0.50	0.51	0.52	0.68	0.70	0.84	0.88	0.93	0.87	0.82	0.89	0.80	0.85	0.85	0.85	0.98
b	Dams, concrete	2.11	0.47	0.47	0.52	0.57	0.62	0.62	0.76	0.76	0.76	0.71	0.76	0.76	0.76	0.76	0.76	0.81
c	Pumping plants, bldg & equip	2.06	0.48	0.48	0.50	0.55	0.58	0.62	0.63	0.63	0.64	0.64	0.67	0.66	0.69	0.72	0.73	0.76
d	struct, reinf conc, & improv	2.31	0.43	0.44	0.46	0.53	0.57	0.63	0.64	0.63	0.66	0.66	0.70	0.68	0.68	0.68	0.70	0.75
e	equipment	1.81	0.55	0.55	0.54	0.56	0.58	0.59	0.60	0.60	0.60	0.61	0.61	0.61	0.70	0.77	0.78	0.77
f	pumps & prime equip	1.80	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
g	access elec & misc equip	1.86	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
h	discharge pipes	2.18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0.69	0.69
i	Canals	2.16	0.46	0.47	0.49	0.61	0.64	0.73	0.78	0.81	0.77	0.74	0.85	0.76	0.78	0.78	0.78	0.86
j	Conduits, tunnels, free flow, conc lined	2.26	....	....	....	....	....	....	....	....	....	....	....	....	0.68	0.69	0.71	0.82
k	Laterals and drains	2.42	0.41	0.41	0.45	0.51	0.56	0.60	0.64	0.67	0.71	0.72	0.77	0.76	0.70	0.71	0.74	0.76
l	Primary roads	2.08	0.48	0.48	0.53	0.58	0.67	0.77	0.86	0.82	0.82	0.77	0.77	0.77	0.82	0.82	0.82	0.82
m	Secondary roads, unsurf	1.98	0.50	0.50	0.55	0.61	0.71	0.86	0.96	0.96	0.91	0.91	0.86	0.86	0.86	0.86	0.91	0.86
n	Bridges, steel	2.18	0.46	0.46	0.50	0.55	0.60	0.69	0.71	0.69	0.73	0.73	0.73	0.69	0.76	0.78	0.78	0.85
o	Power plants, hydro, bldg & equip	1.98	0.50	0.51	0.52	0.57	0.60	0.65	0.66	0.67	0.68	0.73	0.70	0.69	0.71	0.75	0.77	0.78
p	structs, reinf conc, imprv	2.28	0.44	0.45	0.46	0.53	0.58	0.65	0.67	0.68	0.69	0.69	0.74	0.71	0.70	0.70	0.71	0.78
r	equipment	1.83	0.55	0.55	0.55	0.62	0.62	0.65	0.66	0.66	0.68	0.67	0.67	0.68	0.73	0.78	0.80	0.78
s	turbines & generators	1.80	0.56	0.56	0.56	0.64	0.67	0.67	0.68	0.68	0.70	0.69	0.69	0.69	0.76	0.80	0.83	0.80
t	acces elec equip	1.84	0.54	0.54	0.55	0.56	0.55	0.57	0.58	0.58	0.58	0.58	0.59	0.61	0.65	0.72	0.72	0.73
u	misc equip	1.95	0.51	0.51	0.53	0.55	0.58	0.65	0.65	0.67	0.68	0.71	0.70	0.71	0.70	0.70	0.73	0.73
v	penstocks	2.18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0.69	0.69
w	Transm switchyards & substa	2.03	0.54	0.54	0.54	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.70	0.70	0.76
x	Transm lines, wood pole 115 kv	2.02	0.50	0.52	0.54	0.59	0.62	0.64	0.64	0.73	0.74	0.69	0.72	0.82	0.89	0.94	0.99	0.99
y	Transm lines, steel tower 230 kv	1.91	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
z	Permanent genl property, bldgs	2.26	0.44	0.44	0.44	0.49	0.53	0.53	0.58	0.58	0.58	0.62	0.62	0.62	0.62	0.66	0.66	0.68

Item	Class of Construction	1949				1950				1951				1952				1953	
		Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.
	Composite Index	**1.04**	**1.04**	**1.04**	**1.02**	**1.02**	**0.98**	**0.95**	**0.94**	**1.01**	**1.05**	**1.07**	**1.07**	**1.10**	**1.11**	**1.12**	**1.13**	**1.13**	**1.14**
a	Dams, earth	1.12	1.10	1.08	1.05	1.05	1.00	0.92	0.88	0.98	1.05	1.05	1.05	1.05	1.08	1.10	1.10	1.09	1.10
b	Dams, concrete	1.00	1.02	1.02	1.02	1.02	0.97	0.93	0.95	1.02	1.07	1.07	1.07	1.07	1.09	1.07	1.07	1.07	1.08
c	Pumping plants, bldg & equip	1.02	1.02	1.00	0.97	0.97	0.97	0.97	1.00	1.04	1.09	1.12	1.14	1.16	1.16	1.19	1.20	1.18	1.18
d	struct, reinf conc, & improv	1.06	1.04	1.00	1.00	0.98	0.98	0.98	1.00	1.02	1.06	1.08	1.10	1.10	1.12	1.15	1.16	1.17	1.15
e	equipment	0.98	0.98	0.97	0.94	0.97	0.94	0.94	1.02	1.10	1.13	1.16	1.19	1.22	1.22	1.22	1.22	1.23	1.23
f	pumps & prime equip	0.94	0.97	0.97	0.94	0.97	0.94	0.94	1.00	1.08	1.14	1.17	1.17	1.22	1.22	1.22	1.22	1.28	1.28
g	access elec & misc equip	1.05	0.99	0.97	0.97	0.97	0.94	0.94	1.02	1.10	1.10	1.18	1.18	1.18	1.18	1.18	1.18	1.12	1.13
h	discharge pipes	1.10	1.06	0.96	0.94	0.94	0.96	0.96	1.03	1.08	1.12	1.15	1.15	1.17	1.17	1.19	1.21	1.21	1.21
i	Canals	1.08	1.06	1.07	1.02	1.01	1.00	1.00	0.90	1.00	1.02	1.06	1.09	1.11	1.13	1.16	1.18	1.18	1.18
j	Conduits, tunnels, free flow, conc lined	1.02	1.02	1.02	0.97	0.97	0.97	0.97	1.02	1.02	1.06	1.04	1.08	1.08	1.11	1.15	1.15	1.13	1.13
k	Laterals and drains	1.02	1.01	1.02	1.01	1.00	1.00	0.98	0.98	1.01	1.01	1.03	1.05	1.10	1.09	1.12	1.12	1.14	1.20
l	Primary roads	1.06	1.06	1.06	1.06	1.01	0.98	0.94	0.94	0.99	1.03	1.08	1.08	1.11	1.13	1.13	1.15	1.18	1.18
m	Secondary roads, unsurf	1.14	1.11	1.08	1.08	1.04	1.01	0.91	0.88	0.96	1.01	1.06	1.09	1.14	1.14	1.14	1.16	1.19	1.12
n	Bridges, steel	1.06	1.03	1.03	1.01	0.96	0.96	0.94	0.96	1.01	1.10	1.12	1.12	1.12	1.12	1.15	1.17	1.19	1.17
o	Power plants, hydro, bldg & equip	1.01	1.01	0.99	0.96	0.96	0.96	0.96	0.98	1.06	1.11	1.11	1.13	1.16	1.16	1.19	1.20	1.21	1.21
p	structs, reinf conc, imprv	1.05	1.03	1.01	1.01	0.99	0.96	0.96	0.99	1.03	1.05	1.09	1.10	1.12	1.14	1.16	1.16	1.17	1.15
r	equipment	0.96	0.96	0.93	0.93	0.96	0.96	0.96	1.01	1.09	1.14	1.15	1.15	1.20	1.20	1.20	1.21	1.23	1.25
s	turbines & generators	0.97	0.97	0.94	0.94	0.97	0.94	0.94	1.00	1.08	1.17	1.17	1.17	1.22	1.25	1.22	1.24	1.27	1.29
t	acces elec equip	1.01	1.01	0.98	0.92	0.92	0.92	0.95	1.01	1.14	1.14	1.14	1.14	1.20	1.20	1.20	1.21	1.15	1.16
u	misc equip	1.05	1.05	0.98	0.95	0.97	0.95	0.97	1.00	1.08	1.10	1.13	1.13	1.13	1.13	1.13	1.13	1.15	1.14
v	penstocks	1.10	1.06	0.96	0.94	0.94	0.96	0.96	1.03	1.08	1.12	1.15	1.15	1.17	1.17	1.19	1.21	1.21	1.21
w	Transm switchyards & substa	0.99	0.97	0.94	0.94	0.97	0.92	0.92	1.01	1.11	1.19	1.19	1.19	1.19	1.19	1.22	1.22	1.22	1.22
x	Transm lines, wood pole 115 kv	1.24	1.19	1.16	1.11	0.99	0.96	0.89	0.89	0.94	1.04	1.09	1.09	1.11	1.11	1.13	1.13	1.11	1.06
y	Transm lines, steel tower 230 kv	....	....	....	....	....	....	0.92	0.94	1.02	1.13	1.13	1.13	1.13	1.13	1.13	1.14	1.14	1.14
z	Permanent genl property, bldgs	0.95	0.93	0.93	0.93	0.93	0.93	0.95	1.06	1.11	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.14	1.14

* Multiplier to convert to 1940 = 1.0 base

Based on combined costs of material and labor furnished by the contractor, and material and labor furnished by the government on B of R projects in 17 western states and Alaska



IRRIGATION AND HYDRO-POWER construction cost indexes computed by the Bureau of Reclamation, Department of Interior, turn up in 1955 after decline from 1953 high.

Reclamation Indexes

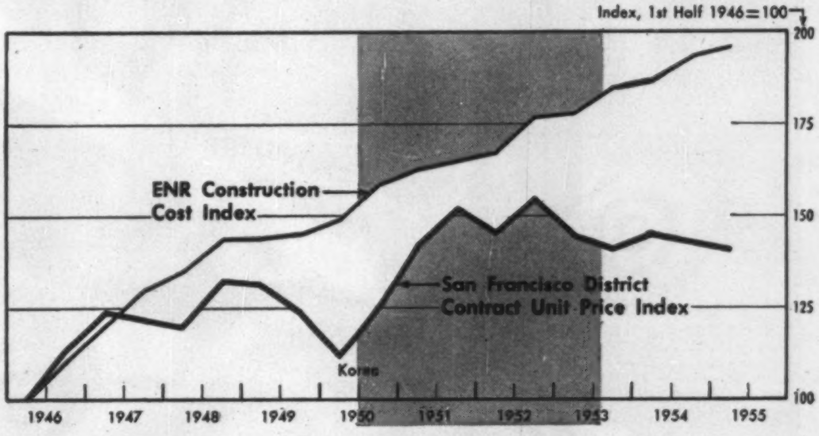
Bureau of Reclamation cost indexes measure trends for 26 types of work. The composite index includes a concrete dam, power generating plant, power transmission system, earth dam, canals, laterals and drains.

1947				1948				
Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Item
0.86	**0.89**	**0.94**	**0.97**	**0.99**	**0.99**	**1.01**	**1.05**	
0.98	1.00	1.02	1.05	1.05	1.05	1.08	1.12	a
0.83	0.85	0.88	0.92	0.95	0.95	0.95	1.00	b
0.80	0.85	0.90	0.94	0.95	0.99	1.01	1.04	c
0.80	0.86	0.95	0.98	1.00	1.01	1.01	1.06	d
0.78	0.82	0.82	0.87	0.87	0.95	0.97	1.02	e
....	....	....	....	....	....	....	1.03	f
....	....	....	....	....	....	....	1.08	g
0.82	0.87	0.89	0.92	0.92	0.96	1.03	1.10	h
0.89	0.94	0.99	1.02	1.02	1.04	1.06	1.08	i
0.82	0.84	0.86	0.88	0.88	0.88	0.97	1.02	j
0.86	0.86	0.91	0.97	0.97	0.98	1.01	1.03	k
0.82	0.89	0.91	0.94	0.96	0.98	1.01	1.06	l
0.88	0.96	0.98	1.01	1.04	1.06	1.11	1.14	m
0.87	0.92	0.96	1.01	1.01	1.01	1.01	1.06	n
0.80	0.85	0.88	0.92	0.93	0.96	0.99	1.04	o
0.82	0.87	0.95	0.99	0.99	1.00	1.01	1.05	p
0.79	0.82	0.84	0.89	0.90	0.92	0.98	0.98	r
0.81	0.83	0.83	0.89	0.89	0.92	0.98	1.00	s
0.74	0.89	0.89	0.89	0.99	1.01	1.02	1.03	t
0.76	0.81	0.81	0.88	0.89	0.92	1.02	1.08	u
0.82	0.87	0.89	0.92	0.92	0.96	1.03	1.10	v
0.81	0.83	0.86	0.89	0.92	0.94	0.97	0.99	w
0.99	1.09	1.09	1.19	1.19	1.19	1.24	1.24	x
....	....	....	....	....	....	....	....	y
0.75	0.82	0.84	0.86	0.91	0.91	0.95	0.95	z

1953		1954				1955			
July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Item
1.16	**1.17**	**1.13**	**1.13**	**1.11**	**1.09**	**1.07**	**1.09**	**1.11**	
1.10	1.12	1.09	1.09	1.06	1.03	0.98	1.03	1.05	a
1.08	1.09	1.04	1.04	1.02	1.00	0.97	1.00	1.02	b
1.19	1.24	1.24	1.24	1.24	1.25	1.25	1.26	1.26	c
1.18	1.20	1.18	1.18	1.19	1.20	1.19	1.21	1.22	d
1.23	1.29	1.29	1.29	1.29	1.30	1.30	1.30	1.30	e
1.28	1.34	1.34	1.34	1.35	1.35	1.35	1.35	1.35	f
1.15	1.18	1.19	1.20	1.20	1.20	1.20	1.20	1.20	g
1.25	1.31	1.30	1.30	1.28	1.30	1.32	1.34	1.36	h
1.14	1.16	1.13	1.13	1.11	1.08	1.00	1.02	1.05	i
1.13	1.16	1.16	1.16	1.13	1.13	1.14	1.15	1.16	j
1.19	1.20	1.14	1.14	1.12	1.09	1.15	1.16	1.18	k
1.19	1.16	1.13	1.13	1.11	1.10	1.11	1.11	1.12	l
1.14	1.12	1.05	1.05	1.03	1.02	1.03	1.03	1.04	m
1.20	1.28	1.27	1.27	1.27	1.30	1.30	1.30	1.32	n
1.22	1.25	1.24	1.25	1.25	1.26	1.25	1.26	1.26	o
1.18	1.21	1.19	1.19	1.19	1.21	1.19	1.20	1.22	p
1.25	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	r
1.28	1.31	1.31	1.31	1.32	1.32	1.31	1.31	1.31	s
1.18	1.21	1.22	1.23	1.23	1.23	1.24	1.24	1.24	t
1.15	1.18	1.17	1.17	1.17	1.19	1.20	1.21	1.23	u
1.25	1.31	1.30	1.30	1.28	1.30	1.32	1.34	1.36	v
1.31	1.37	1.37	1.37	1.37	1.38	1.39	1.38	1.38	w
1.09	1.09	1.06	1.06	1.05	1.06	1.08	1.00	1.02	x
1.18	1.20	1.18	1.18	1.18	1.19	1.20	1.21	1.22	y
1.14	1.17	1.15	1.15	1.15	1.17	1.18	1.18	1.20	z

Bids Prices in Western States

The downtrend in bid prices since 1953 continues in the face of rising costs. Evidence of this trend in the western states comes from the index compiled by the Estimate Section, San Francisco District, Corps of Engineers, U. S. Army based on the average of three low bids on all significant projects for which unit prices were reported in "Daily Construction Service." The index, its components and their weights are shown here.



Contract Unit Price Index—Western States

Estimates Section, San Francisco District, Corps of Engineers, U. S. Army—1st half 1946 = 100

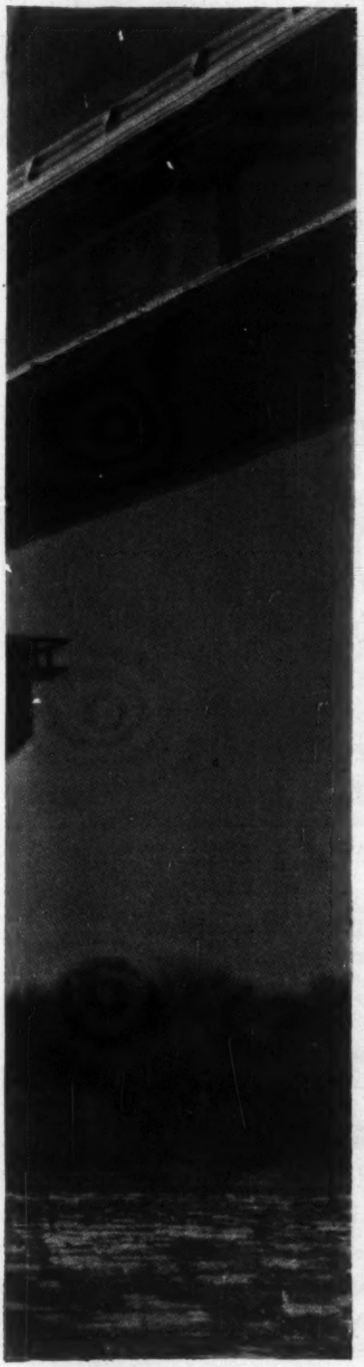
	1946	1949		1950		1952		1953		1954		1955
	1st half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half	2nd half	1st half
Index. 1st Hf '46 = 100..	**100.0**	**132.2**	**124.3**	**111.9**	**126.08**	**144.76**	**155.04**	**145.35**	**140.50**	**145.09**	**142.83**	**141.37**
Items used in index Unit	**Based on these average unit prices**											
Cr rock base course....ton	2.81	2.29	2.41	2.37	2.20	2.60	3.18	2.80	3.03	2.96	2.92	3.03
Plant mix aggregate....ton	4.82	4.43	4.35	3.75	4.68	5.51	5.25	5.99	5.16	5.84	5.43	5.86
Plant mix asphalt......ton	22.00	26.85	22.20	18.98	23.00	24.34	24.60	24.00	26.00	21.46	26.00	25.00
Cover aggregate.........ton	5.09	5.65	5.50	5.22	5.07	4.06	6.62	6.37	6.44	6.42	6.39	6.63
Structural concrete.......cy	50.65	65.07	59.20	54.11	58.00	75.81	73.20	71.00	72.00	67.71	70.41	67.00
Pavement concrete......cy	13.20	19.69	24.83	18.50	20.00	18.97	28.88	19.00	19.00	19.09	21.55	22.00
Reinforcing steel........cwt	9.60	12.70	11.40	11.00	13.40	14.30	14.60	13.70	14.00	14.00	14.00	13.00
Cement.................bbl	2.84	4.98	4.52	4.24	4.75	4.63	4.77	4.83	4.91	4.63	4.52	4.68
CM pipe 12"..............lf	2.20	3.03	2.88	2.75	3.00	3.65	3.85	3.61	3.78	3.70	3.67	3.60
CM pipe 24"..............lf	4.05	5.26	4.88	4.82	5.23	6.16	6.53	6.46	6.75	6.33	6.55	6.84
RC pipe 18"..............lf	3.50	4.27	4.55	4.54	5.08	5.50	5.83	6.25	5.51	5.10	5.37	5.15
RC pipe 36"..............lf	8.29	10.47	10.70	9.48	10.26	14.33	13.27	13.94	12.66	11.24	11.66	11.62
VC pipe 6"...............lf	1.87	2.39	2.29	2.00	2.44	2.94	3.32	3.01	2.87	2.80	2.98	2.75
VC pipe 8"...............lf	2.22	2.80	2.81	2.82	2.60	3.77	3.93	3.53	3.46	3.40	3.83	3.36
Sewer manhole....1/10 ea	16.50	20.80	19.20	17.80	21.20	22.82	26.66	25.34	17.60	23.67	23.33	23.70
Roadway excavation.....cy	0.67	.96	.90	.64	.78	.92	1.22	1.07	1.15	.87	.90	.80
Structural excavation....cy	2.49	4.27	3.26	3.14	3.76	3.42	3.70	3.57	4.26	3.72	3.96	3.78
Watering............M gal	2.13	2.13	1.75	1.66	1.84	1.97	2.22	2.14	2.07	1.74	1.70	1.71
Flat wheel roller.......R-hr	5.47	7.82	6.86	7.79	6.92	7.26	8.68	8.00	9.36	9.86	7.05	8.50
Piling, gr wood, fur.......lf	0.64	0.65	0.58	0.64	0.88	1.68	1.09	1.01	1.38	1.48	1.31	1.17
Piling, treated, fur........lf	1.25	1.45	1.45	1.20	1.53	2.03	1.93	1.77	1.74	1.64	2.01	1.84
Timber in place....100 fbm	16.60	26.33	25.34	21.20	27.70	30.90	30.50	30.80	28.00	42.20	27.59	32.10
2" Galv steel pipe.........lf	1.04	1.38	1.18	1.24	1.33	1.51	1.61	1.68	1.45	1.62	1.62	1.65
Cast-iron pipe 6"..........lf	2.86	4.17	3.93	3.50	3.86	4.42	5.57	4.15	4.53	4.15	4.34	4.36
Cast-iron pipe 8"..........lf	3.80	6.47	5.01	5.35	5.66	6.29	6.64	5.66	5.68	5.04	6.71	4.80
Gate valve 6"......1/10 ea	7.06	9.70	8.80	8.00	9.00	10.55	12.60	11.80	9.30	10.30	10.20	8.85
Total in dollars...........	**193.65**	**256.01**	**240.78**	**216.74**	**244.17**	**280.34**	**300.25**	**281.48**	**272.09**	**280.97**	**276.60**	**273.78**

Saved– 57 tons of steel.

USS HIGH STRENGTH STEELS

–the big step forward in bridge construction

. . by utilizing USS TRI-TEN "E" Steel



ALTERNATE DESIGNS of this 2-lane highway bridge crossing the Missouri River at Leavenworth, Kansas, called for the use of either 880 tons of structural silicon steel, or 823 tons of USS TRI-TEN "E" Steel. Fifty-seven tons of steel were saved by adopting TRI-TEN "E" Steel.

Here again, as it has in a number of bridges recently constructed or now being erected, the use of USS High Strength Steels saves weight and saves steel. And because of the smaller tonnage of steel required by such construction, material costs, too, are frequently lower, steel transportation costs are also reduced as are the size and cost of secondary members and foundations. Together these add up to total cost savings that in some cases have run as high as 15% of the cost of the superstructure.

USS TRI-TEN "E" Steel is a high strength low-alloy steel particularly adapted for use in welded construction and intended primarily for weight reduction by means of greater strength and toughness.

This superior steel meets all the requirements of ASTM Specification A242. With a yield point 50% greater than that of structural carbon steel (ASTM A7) in thicknesses of ¾" and less, the slightly higher cost of USS TRI-TEN "E" Steel can generally be justified—even without consideration of the other cost reducing benefits mentioned above.

USS TRI-TEN "E" Steel has been used or specified in such bridges as the Columbia River Bridge at Umatilla, Oregon (1964 tons); The Paseo Bridge over the Missouri River at Kansas City, Missouri (3759 tons); the Ohio River Bridge at Shawneetown, Ill. (2295 tons); the Missouri River Bridge at Jefferson City, Missouri (1692 tons). These structures are typical of the growing list of bridges in which USS High Strength Steels are being used to provide maximum strength, safety and durability with a minimum of weight and costs.

NOW AVAILABLE . . . Our new "Design Manual for High Strength Steels" is ready for distribution. This excellent book contains comprehensive and practical information that you will find extremely useful in designing your product for great economy and efficiency by the sound use of high strength steels.

For your free copy, write on your company letterhead giving your title or department, to United States Steel Corporation, Room 4951, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

◀ **TO SAVE WEIGHT HERE, USS Tri-Ten "E" was used for arch ribs and tiegirders of the two 420-ft. long continuous tied arch span. Owner—City of Leavenworth, Kansas. Designed and engineered by Howard, Needles, Tammen and Bergendoff of Kansas City. Structural steel fabrication—main span by Kansas City Structural Steel Co.; Missouri approach and Kansas approach by Missouri Valley Steel, Inc. of Leavenworth, Kansas. Erection—Missouri approach and main span by Kansas City Bridge Company; Kansas approach by Maxwell Bridge Co., Columbus, Kansas.**

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
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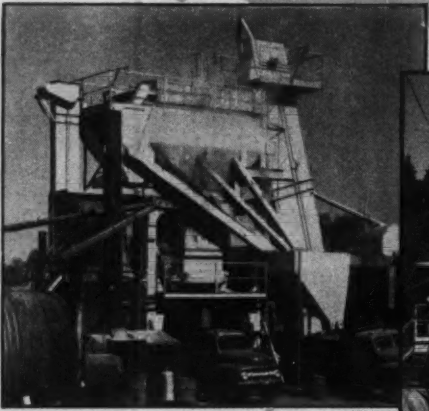
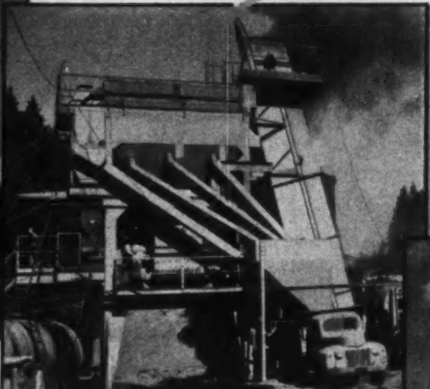
USS

UNITED STATES STEEL

ACROSS AMERICA MADSEN ASPHALT PLANTS



● The MADSEN Model 481 4000-lb. Batch Capacity Asphalt Plant operating in the midwest.



● Here is a MADSEN Model 481 Asphalt Plant producing materials for an Oregon State highway project.

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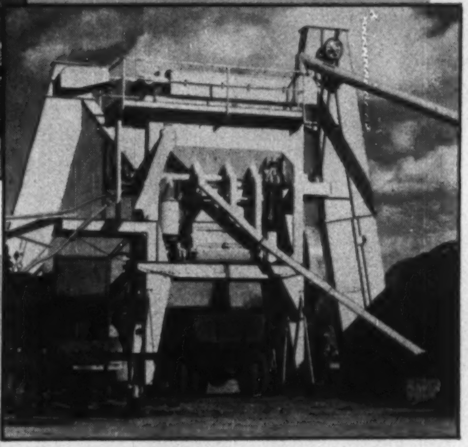
MADSEN
Since 1910



● A MADSEN 2000-lb. SPECIAL Asphalt Plant in operation for a Minnesota contractor.

HELPING TO BUILD...

HIGHWAYS FOR AMERICA

HELPING TO BUILD...

SOUND OPERATIONS FOR CONTRACTORS

America's stepped-up program for super-highways, expressways, toll roads and airports has put the spotlight on MADSEN Asphalt Plants. More and more contractors are buying MADSEN because MADSEN'S superior engineering, sound basic design, and outstanding features provide the basis for a more profitable operation. MADSEN'S faster charge-mix-discharge cycle, higher sustained daily production, lower maintenance costs, and plain down-to-earth ability to make more money on every asphalt mixing job . . . enable MADSEN owners to bid advantageously on today's asphalt paving jobs and to show a greater return on their investment. Why not join the MADSEN crowd. See your MADSEN Distributor today and get the details on these money-making asphalt plants.

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- WET TUBE DUST WASHERS
- ROAD PUG TRAVEL-MIX PLANTS
- WEIGH BATCHERS
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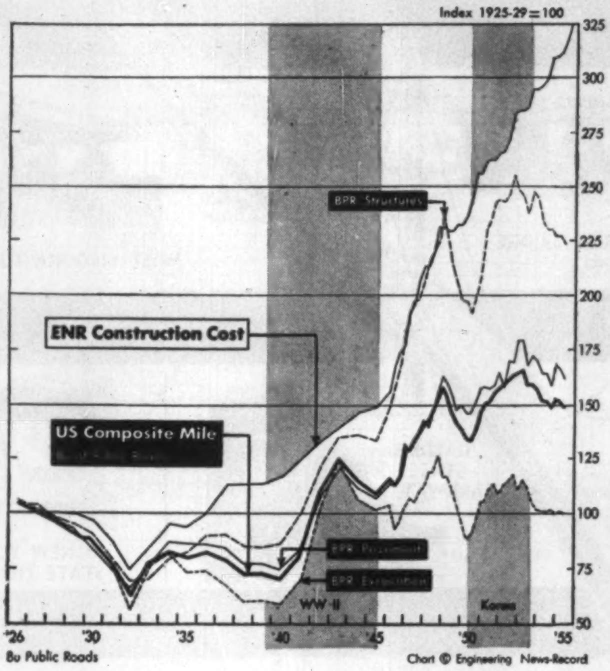
MADSEN WORKS MADSEN LOS ANGELES *Equipment that Serves*



Bu Public Roads

Chart © Engineering News-Record

Composite Standard Mile Highway Price Index

U. S. Bureau of Public Roads, 1925-29 = 100

Year	Excavation[1] 17,491 cy* Bid price[3]	Excavation[1] 17,491 cy* Sub-index	Surfacing[2] 3,726 sy* Bid price[3]	Surfacing[2] 3,726 sy* Sub-index	Structures: Reinf. steel 16,000* lb. Bid price[3]	Structures: Struct. steel 4,325* lb. Bid price[3]	Structures: Struct. concr. 68* cy Bid price[3]	Structures: Comb. Sub-index	Composite mile index
Base 25-'29=100	$0.35†	100.0	$2.22†	100.0	$0.052†	$0.067†	$22.15†	100.0	100.0
1926	.36	103.7	2.29	103.1	.053	.074	22.76	103.7	103.4
1930	.30	86.3	1.86	84.1	.045	.061	20.08	89.4	85.7
1932	.18	55.0	1.44	64.8	.034	.046	15.33	68.0	61.0
1939	.21	59.8	1.73	77.8	.044	.059	19.13	85.9	72.6
1940	.21	59.2	1.68	75.6	.045	.063	19.17	87.6	71.6
1941	.24	69.2	1.87	84.1	.054	.076	21.44	100.8	81.4
1942	.37	104.1	2.39	107.9	.065	.090	26.16	122.3	108.8
1943	.44	124.0	2.71	122.3	.067	.095	30.19	134.4	124.9
1944	.37	106.6	2.45	110.6	.064	.089	31.94	136.5	113.1
1945	.36	101.6	2.38	107.4	.062	.077	31.62	132.5	109.0
1946	.35	99.1	2.65	119.3	.075	.113	38.79	164.7	119.0
1947	.38	108.4	3.01	135.5	.093	.132	45.84	196.9	135.0
1948	.42	119.3	3.37	151.9	.108	.158	51.00	223.9	151.2
1949	.38	107.4	3.40	153.1	.104	.146	47.36	210.3	145.8
1950:	.33	94.5	3.32	149.8	.100	.139	44.62	199.4	137.7
1951:	**.39**	**110.0**	**3.54**	**159.5**	**.120**	**.180**	**52.07**	**237.8**	**153.7**
Q1	.37	106.3	3.51	158.3	.116	.180	50.12	230.4	150.6
Q2	.39	111.4	3.48	156.9	.119	.170	51.45	234.0	152.4
Q3	.40	113.7	3.51	158.3	.122	.182	53.21	242.5	155.1
Q4	.38	108.5	3.65	164.6	.123	.187	53.51	244.3	156.7
1952:	**.40**	**114.2**	**3.80**	**171.3**	**.124**	**.186**	**54.50**	**247.8**	**162.5**
Q1	.40	112.8	3.71	158.3	.123	.184	52.97	242.5	159.3
Q2	.41	115.4	3.78	170.4	.122	.175	54.80	245.5	162.1
Q3	.41	117.9	3.74	168.6	.126	.195	56.55	255.4	163.6
Q4	.39	110.5	3.97	179.0	.126	.191	53.69	247.7	164.9
1953:	**.38**	**108.6**	**3.82**	**172.0**	**.122**	**.186**	**53.53**	**243.8**	**160.2**
Q1	.40	114.8	3.96	178.5	.121	.192	53.91	245.4	165.9
Q2	.39	112.0	3.73	168.2	.120	.180	51.67	237.1	158.5
Q3	.37	105.1	3.81	171.8	.123	.196	54.07	247.6	159.4
Q4	.36	102.3	3.76	169.5	.123	.175	54.48	245.0	156.9
1954:	**.35**	**100.9**	**3.63**	**163.6**	**.116**	**.167**	**50.91**	**229.9**	**151.2**
Q1	.36	101.4	3.63	163.7	.115	.174	52.00	233.9	152.0
Q2	.35	100.9	3.63	163.7	.115	.167	50.61	229.1	151.1
Q3	.36	101.4	3.53	159.2	.117	.167	50.64	229.9	149.2
Q4	.35	100.0	3.72	167.7	.115	.158	50.40	226.8	152.4
1955:									
Q1	.36	101.1	3.67	165.5	.113	.157	51.14	227.3	151.8
Q2	.35	100.3	3.60	162.3	.112	.152	50.09	223.3	149.4

[1] Common excav. plus other excav. items expressed as equivalent common excav.

[2] Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.

[3] Calculated to one more decimal place than shown in this table. * Fixed quantities used for establishing composite mile for price trend. † Prices used for establishing composite mile index bases.

Highway Price Skid Ends in the West as Contractors Raise Bids

Highway contractors are bidding their way out of a profitless prosperity. During the first quarter of '55 nearly all of the western states which compute quarterly or monthly highway bid price indexes reported the price depression of '53-'54 running even deeper this year. But the picture changed abruptly during the second quarter when all indexes reported in showed contractors upping their bids substantially.

California's second quarter highway price index jumped 12% above the first quarter. In other states the increases were: Oregon, 9%; Washington, 5.8%; Idaho, 5.7% (this was on top of a big first quarter increase); Texas, 4.5%; Oklahoma, 8.7%; and Nebraska, 6.1%. Minnesota's semiannual index indicated contractors raising their prices in the first half of this year 2% above the second half of 1954.

Nationally, the Bureau of Public Roads Composite Mile Price Index for federal-aid highway projects ran counter to the western states indexes as it dipped 1.6% in the second quarter. It was the second consecutive quarterly decline following a rise in the final quarter of '54.

While none of the eastern states have reported in because they compute their indexes annually, Pennsylvania reports average prices on most major bid items dropped in the first half of this year below the first half of 1954 and most were also below the second half of '54.

In some of the states where highway prices started up in '55 the rise was expected. States reasoned this way: Contractors have run out of ways to trim their costs; they'll have to raise their prices if labor and materials costs move up. During the first six months of this year, materials and labor costs paid by contractors climbed by 2.1% as measured by the ENR 20-Cities Construction Cost Index. For the first nine months, costs are up 4.7%. Highway contractors can't absorb a cost rise of that magnitude. Bid prices should continue to firm up during the second half of this year.

On this and the following pages are the records of state highway price indexes reported to ENR. Charts compare index trends in neighboring states with the U.S. Composite Mile. For some states, a complete record and description of the index were in last year's Cost Issue (ENR Oct. 7, 1955, p. 115) and these have not been repeated this year because later index values haven't been computed as we go to press.

Colorado, Unit Prices Used in Contract Price Index

Item	Unit	Quantity	Unit Price 1949	Unit Price 1951	Unit Price 1952	Unit Price 1953	Unit Price 1954	2nd Q 1955
Excavation, unclass	cy	10,630	$0.441	$0.338	$0.374	$0.290	$0.277	$0.241
struct.	cy	109	3.376	3.113	3.983	2.645	2.045	2.147
Backfill, struct.	cy	116	1.948	1.929	1.888	1.654	1.443	1.089
Rolling	hr	88	7.470	8.089	9.174	8.973	8.843	8.316
Wetting	Mgal	351	1.382	1.407	1.261	1.095	1.123	1.007
Overhaul	stay	64,112	0.014	0.010	0.012	0.009	0.008	0.007
	ydml	6,055	0.122	0.107	0.110	0.097	0.099	0.106
	tnml	12,188	0.091	0.079	0.111	0.082	0.073	0.076
Sub-base	t	2,998*	0.521	0.566	0.589	0.542	0.376	0.357
Gravel, cr rock surf	t	1,978	0.894	0.974	1.094	0.939	0.746	0.812
Asphalt	t	17	37.500	32.154	36.928	27.868	26.236	27.153
liquid	gal	10,252	0.151	0.153	0.162	0.152	0.148	0.160
Road mix process	sy	4,659	0.097	0.089	0.090	0.089	0.082	0.078
Stone screenings	t	70	3.727	5.755	6.299	5.809	5.106	5.315
Asph surf, plant mix	t	279	4.500	4.103	4.624	3.434	3.315	3.132
Concrete pavement	sy	449	3.512	2.800	3.473	3.432	3.858	4.227
Bridge timber	Mfbm	1	236.378	325.395	309.120	268.521	263.387	368.557
Concrete	cy	36	48.564	51.007	53.777	53.539	48.721	46.943
Steel, reinf.	lb	4,107	0.115	0.072	0.067	0.083	0.111	0.105
struct.	lb	7,114	0.133	0.051	0.114	0.095	0.142	0.130
Culvert, RCCP	lf	16♯	8.263	18.059	7.078	6.392	6.303	5.091
CMP	lf	109♯	5.823	6.924	7.335	7.501	7.366	6.735
Fence, barbed wire	lf	1,286	0.220	0.235	0.239	0.232	0.222	0.220
Sewer pipe	lf	17♯	7.504	10.440	5.898	6.655	7.498	7.431†

* incl all matl whether bid as sub-base or select borrow ♯ incl all diam priced at average of all pipe used † estimated

CHESAPEAKE BAY BRIDGE, MARYLAND
DELAWARE MEMORIAL BRIDGE
WEST VIRGINIA TURNPIKE
PENNSYLVANIA TURNPIKE
BAMBERGER'S PLAINFIELD, N. J.
GARDEN STATE PARKWAY, N. J.
NEW YORK STATE THRUWAY
NEW JERSEY TURNPIKE
NIAGARA FALLS PARKING LOT
LAREDO BRIDGE, TEXAS
COLEMAN MEMORIAL BRIDGE, YORKTOWN, V.
1930-1955
25 YEARS OF LEADERSHIP IN TOLL EQUIPMENT

AND MANY OTHERS. INCLUDING

Golden Gate Bridge, San Francisco
York River Bridge, Va.
Elizabeth River Bridge, Va.
Brooklyn-Battery Tunnel, N. Y.
Oakland Bay Bridge, Calif.
Holland Tunnel, N. Y.-N. J.
Augusta Bridge, Maine
Bronx-Whitestone Bridge, N. Y.
Triboro Bridge, N. Y.
Charter Oak Bridge, Hartford
Rio Grande Gateway Bridge, Texas
Queens-Midtown Tunnel, N. Y.
Jones Beach Causeways, N. Y.
Mystic River Bridge, Boston
Sumner Tunnel, Boston
George Washington Bridge, N. Y.
Venetian Causeways, Fla.
Lincoln Tunnel, N. Y.-N. J.
Indiana Toll Road
Sunshine Skyway, Florida
Bay St. Louis Bridge, Miss.
New York Zoological Park
Sandy Point Park, Md.
Flushing Meadow Parking Lot, N. Y.
Trenton-Morrisville Toll Bridge

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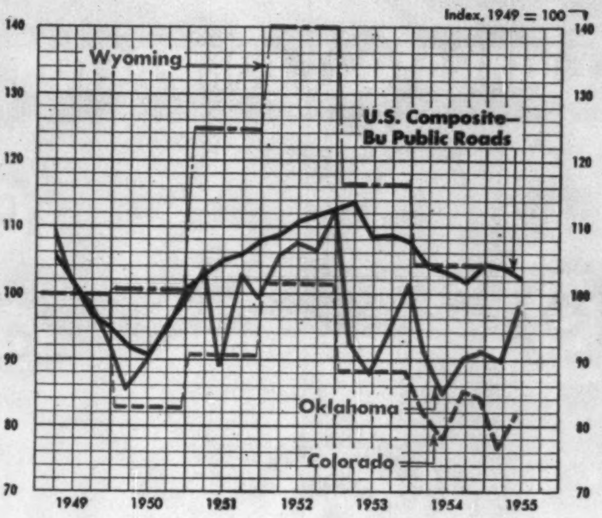


• **Wyoming** computes its composite highway price index by first computing sub-indexes for each of six bid items (see table below). These sub-indexes, based on 1940 = 100, are then multiplied by percentage weights and added to get the composite index.

Wyoming, Average Unit Prices and Index

Weight Year	Excav common 39% $/cy	Grav base* 29% $/cy	Oil 9% ¢/gal	Conc Cl A 11% $/cy	Struct steel 6% $/lb	Timber treatd piling 6% $/lf	Comp. Index '40=100
1940........	$0.125	$0.670	$0.067	$18.15	$0.067	$1.25	100
1941........	0.156	0.913	0.084	22.35	0.087	1.238	126
1942........	0.271	1.136	0.094	25.00	0.091	1.599	178
1943........	0.240	1.074	0.091	24.26	0.095	1.908	166
1944........	0.327	1.122	0.087	36.59	0.099	2.047	203
1945........	0.331	1.204	0.087	30.72	0.102	1.250	201
1946........	0.250	1.263	0.093	33.61	0.108	2.105	186
1947........	0.284	0.860	0.124	45.89	0.151	2.421	197
1948........	0.238	0.953	0.152	55.20	0.168	3.562	200
1949........	0.199	0.780	0.124	48.00	0.145	2.512	167
1950........	0.218	0.743	0.104	51.90	0.147	2.351	169
1951........	0.281	0.945	0.125	52.53	0.203	2.724	209
1952........	0.344	0.907	0.126	68.00	0.193	3.150	236
1953........	0.254	0.827	0.128	50.80	0.196	3.084	196
1954........	0.226	0.777	0.109	51.93	0.128	2.731	175

* surfacing and haul

State Highway Bid Prices Indexes—1937-Date

Reported by State Highway Departments to Engineering News-Record

State	California		Oregon	Washington	Idaho	Montana	New Mexico	Texas	Oklahoma	Colorado	Wyoming	Nebraska	South Dakota	Arkansas	Mississippi	Minnesota	Michigan	Virginia	Pennsylvania	Connecticut
	Bridges	Highway																		
Base year	'39–'40	1940	1940	1940	1950	'40–'41	'38–'41	'49–'53	1940	1949	1940	'32–'41	1940	1940	'37–'41	1940	1940	'37–'41	1940	1939
1937.....	114	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	106.2	112.4	...	102.7	.....	.....	95.2	.....	.....
1938.....	99	.....	.....	.....	.....	.....	100.7	.....	.....	.....	....	99.1	95.5	...	95.8	.....	.....	100.4	.....	.....
1939.....	101	.....	.....	.....	.....	.....	85.3	.....	.....	.....	....	97.5	90.0	...	101.3	.....	94.5	96.1	.....	100.0
1940.....	99	100.0	100.0	100.0	.....	100.0	101.2	.....	.....	.....	100	93.2	100.0	100	100.4	100.0	100.0	95.8	100	93.9
'41.....	122	125.0	115.9	126.7	.....	100.0	113.0	.....	.....	.....	126	103.3	107.9	129	117.1	101.5	112.0	112.5	111	116.7
'42.....	158	157.5	156.8	174.5	.....	125.5	169.1	.....	.....	.....	178	171.4	159.8	181	158.8	145.1	138.0	149.1	138	141.1
'43.....	165	156.4	158.0	181.2	.....	125.5	193.8	.....	.....	.....	166	152.7	197.9	187	173.7	130.2	152.0	172.4	157	n.a.
'44.....	153	177.8	166.4	177.7	.....	125.5	144.0	.....	.....	.....	203	157.0	138.5	199	196.1	131.8	155.5	167.2	133	n.a.
'45.....	167	179.5	145.5	163.9	.....	121.7	187.4	.....	.....	.....	201	181.0	202.7	200	234.9	132.2	154.3	176.9	167	151.5
1946 Q 1.	156	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	190	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	224	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	217	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
'46.	...	**179.7**	**185.9**	**163.0**	.....	**149.6**	**180.1**	.....	.....	.....	**186**	**162.4**	**177.6**	**205**	**163.4**	**147.1**	**155.8**	**198.9**	**171**	**170.1**
1947 Q 1.	224	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	216	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3.	219	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	223	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
'47.	...	**203.3**	**185.1**	**194.6**	.....	**167.5**	**186.6**	.....	.....	.....	**197**	**188.6**	**212.2**	**241**	**187.9**	**169.0**	**151.5**	**205.1**	**201**	**186.4**
1948 Q 1.	220	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	225	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	H1 196.9	.....	.....	.....	.....
3.	238	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	231	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	.....	.....	.....	H2 193.7	.....	.....	.....	.....
'48.	...	**216.6**	**198.6**	**200.4**	.....	**191.6**	**178.7**	.....	.....	.....	**200**	**222.3**	**230.5**	**249**	**197.1**	**195.6**	**162.0**	**234.5**	**208**	**211.8**
1949 Q 1.	207	.....	.....	.....	.....	.....	.....	92.4	M 198.1	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2.	210	.....	.....	H1 226.9	.....	.....	.....	89.0	J 184.7	.....	....	.....	.....	.....	.....	H1 166.3	.....	.....	.....	.....
3.	191	.....	.....	.....	.....	.....	.....	88.3	S 178.7	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4.	187	.....	.....	H2 202.0	.....	.....	.....	88.7	D 168.9	.....	....	.....	.....	.....	.....	H2 n.a.	.....	.....	.....	.....
'49.	...	**190.7**	**181.1**	.....	.....	**180.7**	**179.2**	**89.8**	**180.7**	**100.0**	**167**	**207.1**	**217.0**	**236**	**182.7**	**160.0**	**149.0**	**203.6**	**193**	**184.6**
1950 Q 1.	177	160.6	157.6	.....	.....	.....	.....	87.8	M 155.6	.....	....	.....	177.8	.....	.....	.....	.....	.....	.....	.....
2.	195	180.0	162.2	H1 168.6	.....	.....	.....	89.9	J 161.8	.....	....	.....	167.5	.....	.....	H1 147.5	.....	.....	.....	H1 170.8
3.	212	189.2	175.8	.....	.....	.....	.....	101.6	S 171.0	.....	....	.....	179.5	.....	.....	.....	.....	.....	.....	.....
4.	218	194.8	187.4	H2 169.8	.....	.....	.....	106.2	D 179.7	.....	....	.....	206.8	.....	.....	H2 154.0	.....	.....	.....	H2 185.0
'50.	...	**176.7**	.....	.....	**100.0**	**180.0**	**210.5**	**97.3**	**166.5**	**83.3**	**169**	**191.3**	**176.3**	**229**	**175.5**	**148.5**	**151.5**	**190.8**	**192**	.....
1951 Q 1.	243	215.4	187.7	.....	99.9	.....	.....	103.0	M 187.5	.....	....	.....	189.3	.....	.....	.....	.....	.....	.....	.....
2.	250	238.3	193.6	H1 198.0	114.6	.....	.....	108.6	J 163.0	.....	....	.....	254.6	.....	.....	H1 180.5	.....	.....	.....	H1 213.1
3.	256	221.9	201.0	205.4	106.5	.....	.....	105.9	S 185.5	.....	....	.....	217.0	.....	.....	.....	.....	.....	.....	.....
4.	253	245.4	196.6	209.8	119.9	.....	.....	97.9	D 180.9	.....	....	.....	268.0	.....	.....	H2 197.8	.....	.....	.....	H2 223.7
'51.	...	**210.8**	.....	.....	.....	**192.4**	**206.1**	**104.0**	**192.0**	**90.8**	**209**	**223.7**	**229.4**	**279**	**206.5**	**185.3**	**173.0**	**247.1**	**216**	.....
1952 Q 1.	239	224.8	197.0	192.7	93.9	.....	.....	100.5	M 191.9	.....	....	.....	233.9	.....	.....	.....	.....	.....	.....	.....
2.	236	224.4	199.5	204.3	94.2	.....	.....	104.7	J 195.4	.....	....	.....	216.6	.....	.....	H1 207.1	.....	.....	.....	H1 231.9
3.	239	221.2	205.4	211.4	93.8	.....	.....	109.4	S 193.6	.....	....	.....	204.0	.....	.....	.....	.....	.....	.....	.....
4.	223	226.2	207.2	209.6	106.0	.....	.....	110.1	D 204.0	.....	....	.....	206.5	.....	.....	H2 202.2	.....	.....	.....	H2 221.5
'52.	...	**224.5**	.....	.....	.....	**187.3**	**248.7**	**105.6**	**192.3**	**101.9**	**236**	**231.6**	**212.6**	**313**	**227.4**	**203.0**	**177.0**	**258.4**	**205**	.....
1953 Q 1.	243	218.3	176.3	199.8	104.9	.....	.....	110.0	M 167.2	.....	....	.....	227.1	.....	.....	.....	.....	.....	.....	.....
2.	224	217.5	184.2	211.7	126.6	.....	.....	105.4	J 160.8	.....	....	.....	210.0	.....	.....	H1 180.0	.....	.....	.....	H1 221.2
3.	231	218.0	184.1	212.2	108.5	.....	.....	97.1	S 172.2	.....	....	.....	186.4	.....	.....	.....	.....	.....	.....	.....
4.	235	216.7	183.4	209.6	116.9	.....	.....	98.4	D 184.2	.....	....	.....	206.8	.....	.....	H2 170.7	.....	.....	.....	H2 216.7
'53.	...	.....	.....	.....	.....	**169.0**	**246.9**	**102.7**	**168.6**	**88.9**	**196**	**223.8**	**197.1**	**267**	**186.8**	**175.8**	**178.8**	**226.2**	**209**	.....
1954 Q 1.	221	199.4	186.0	188.8	110.2	.....	.....	96.6	165.9	82.5	....	.....	166.9	.....	.....	.....	.....	.....	.....	.....
2.	217	189.0	167.2	190.0	107.5	.....	.....	98.8	156.0	78.7	....	.....	169.5	A 267	.....	H1 172.2	.....	.....	.....	H1 221.8
3.	220	207.8	160.1	190.6	92.8	.....	.....	95.6	165.2	86.0	....	.....	168.6	S 252	.....	.....	.....	.....	.....	.....
4.	213	192.2	160.5	189.7	73.2	.....	.....	95.9	167.1	85.4	....	.....	166.7	D 245	.....	H2 178.4	.....	.....	.....	H2 224.0
'54.	...	.....	.....	.....	.....	**162.4**	**214.6**	**96.3**	**165.2**	**84.5**	**175**	**204.4**	**168.6**	.....	**195.0**	**174.9**	**168.0**	**203.8**	**208**	.....
1955 Q 1.	217	189.3	156.1	173.0	104.6	.....	.....	94.7	163.9	78.3	....	.....	154.9	.....	.....	H1 182.0	.....	.....	.....	.....
2.	237	212.4	170.0	183.0	110.1	.....	.....	99.0	178.1	83.1	....	.....	172.8	.....	.....	.....	.....	.....	.....	.....

*H1 First Half *H2 Second Half *M March *A April *J June *S Sept *D Dec

The JACKSON MULTIPLE VIBRATORY COMPACTOR

Used on the VAST MAJORITY *of . . .* IMPORTANT ROAD-BUILDING JOBS!

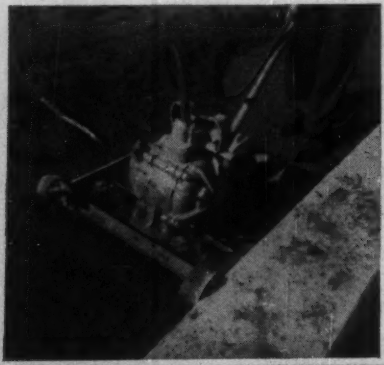
On all of the new toll roads and on dozens of other highway and airport building projects JACKSON MULTIPLE COMPACTORS are the predominant medium for consolidating the granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction. They're also very extensively and successfully used on large area fills of various other types.

The popularity of this equipment has grown by leaps and bounds as one contractor after another discovered that with it specified densities can be achieved with greater uniformity, more economically and in less than one-half the time required with equipment of other types. Moreover, the Jackson Multiple will get into places larger equipment cannot reach, and for the really tight spots, individual compacting units may be detached, fitted with operating handles and operated like a standard, self-propelled manually guided compactor.

If you have any job requiring granular soil compaction, it will pay you to know specifically what Jackson Vibratory Compactors will do. See them at your nearby Jackson Distributor. Literature and Distributor's name on request.

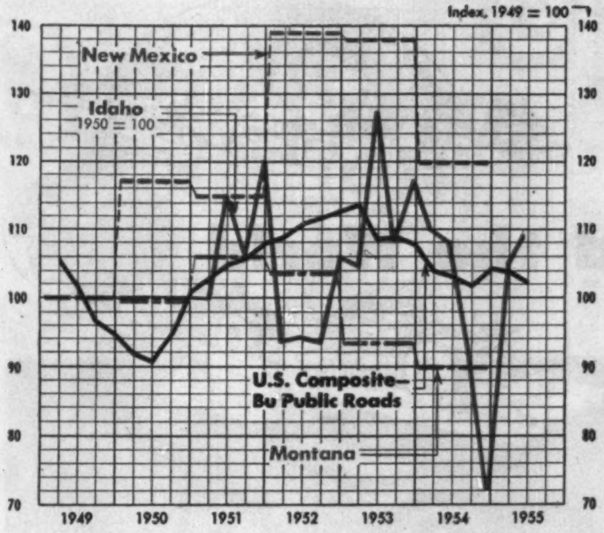
As indicated by the adjacent photos, the JACKSON MULTIPLE is readily adaptable to widening projects of any width.

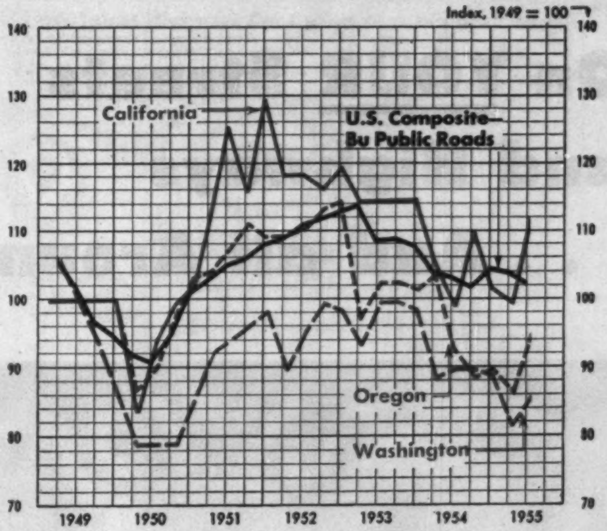
Jackson manually-guided, self-propelled vibratory compactors deliver 4200 2-TON blows per minute. Achieve specified density of granular soils in layers as thick as 10" at the rate of 1800 sq. ft. per hr.



One man can readily operate a twin hook-up of Jackson Compactors, thereby virtually doubling production. Current is usually supplied by power plant on auto trailer (single or twin unit) with hydraulic pick-up of Compactor.

JACKSON
VIBRATORS, Inc.
LUDINGTON, MICHIGAN





- **Idaho** bases its composite highway price index on average prices bid on nine items. The Department of Highways points out how changing physical characteristics of highway jobs can help cause considerable ups or downs in a bid price index.

For instance, one project which accounted for about 50% of the total quantity of unclassified excavation contracted for in the second quarter of '55 had an unusually high percentage of solid rock. This pushed the average price for unclassified excavation sharply above the first quarter. Furthermore, the use of crushed rock instead of crushed gravel on some jobs raised the cost per mile of road mix and the use of quarry rock instead of crushed gravel increased average bid prices for crushed surfacing.

Idaho, Average Contract Unit Prices and Index

Year	Excav uncl $/cy	Sprinkling $/Mgal	Rolling $/hr	Crush surf $/t	Asph all gr $/gal	Road-Mix $/mi	Plant Mix $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Comp. Index '50 = 100
'50.....	$0.618	$1.11	$4.06	$0.95	$0.129	$2,592.42	$1.92	$54.17	$0.112	100.0
'51 Q 1.	0.586	0.85	4.56	0.95	0.130	1,858.76	3.30	54.69	0.123	99.9
Q 2.	0.536	1.09	4.09	1.03	0.139	2,954.16	3.90	50.18	0.115	114.6
Q 3.	0.522	1.30	4.93	1.17	0.142	2,600.32	3.24	60.00	0.160	106.5
Q 4.	0.656	1.46	5.02	1.22	0.145	2,259.81	3.90	.....	.....	119.9
'52 Q 1.	0.407	1.02	3.77	1.07	0.156	2,938.07	.....	56.02	0.150	93.9
Q 2.	0.495	0.99	4.64	1.15	0.139	2,983.59	4.04	66.10	0.129	94.2
Q 3.	0.345	1.08	4.79	1.00	0.152	1,903.47	2.84	58.44	0.127	93.8
Q 4.	0.613	1.15	4.67	0.90	0.155	....	5.43	66.95	0.138	106.0
'53 Q 1.	0.506	1.22	4.22	1.00	0.144	2,977.37	4.56	64.71	0.134	104.9
Q 2.	0.574	1.70	5.00	1.26	0.147	4,214.41	.....	69.73	0.152	126.6
Q 3.	0.410	1.31	3.85	0.90	0.160	2,985.71	3.45	63.41	0.136	108.5
Q 4.	0.553	1.16	3.76	1.17	0.189	3,835.49	3.80	61.39	0.126	116.9
'54 Q 1.	0.448	0.57	3.83	0.80	0.154	1,340.60	3.92	51.17	0.146	110.2
Q 2.	0.426	1.31	4.86	1.26	0.124	2,047.42	2.91	58.97	0.111	107.5
Q 3.	0.296	0.96	4.15	0.96	0.150	3,192.20	2.84	59.90	0.119	92.8
Q 4.	0.342	0.54	3.31	0.64	0.135	2,166.80	2.00	56.45	0.122	73.2
'55 Q 1.	0.333	1.33	4.76	0.932	0.163	2,686.12	3.85	72.25	0.1413	104.6
Q 2.	0.612	0.955	4.57	0.989	0.156	3,309.92	3.47	63.67	0.14	110.1

Oregon, Composite and Sub-Indexes—1940 = 100

Year	Grading	Cr rock surface	Bit mac surface	Asph conc pavement	Port cmt conc pave	Conc bridge & structs	Composite index
1940......	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1941......	108.2	127.7	117.7	112.2	120.2	115.2	115.9
1942......	181.2	187.5	125.9	141.1	164.5	160.3	156.8
1943......	164.7	175.9	167.5	146.2	208.8	156.5	158.0
1944......	202.4	199.2	147.3	125.3	166.4	184.1	166.4
1945......	159.2	163.9	139.4	118.3	141.1	199.3	145.5
1946......	171.0	175.1	147.8	116.6	155.0	205.5	155.9
1947......	211.2	183.5	160.5	118.3	215.2	247.1	185.1
1948......	218.1	193.9	174.7	151.6	235.8	272.2	198.6
1949......	181.0	169.6	173.4	145.6	231.1	250.0	181.1
'50 Q 1...	133.9	150.6	156.1	115.7	227.8	243.1	157.6
Q 2...	132.8	174.9	158.5	127.1	227.8	210.0	162.2
Q 3...	154.6	177.8	174.6	136.9	228.8	241.3	175.8
Q 4...	155.7	190.8	185.7	135.9	227.8	276.4	187.4
'51 Q 1...	190.8	180.9	184.5	124.5	227.8	269.0	187.7
Q 2...	174.5	192.8	192.2	130.1	227.8	289.1	193.6
Q 3...	186.8	213.7	210.8	123.9	240.5	265.9	201.0
Q 4...	210.0	191.6	190.9	130.5	243.6	277.2	196.6
'52 Q 1...	197.8	198.1	187.0	127.3	243.6	278.5	197.0
Q 2...	191.1	210.4	177.3	135.3	243.6	280.0	199.5
Q 3...	201.8	218.8	187.7	131.9	243.6	301.1	205.4
Q 4...	202.9	219.3	188.8	137.3	243.6	282.7	207.2
'53 Q 1...	187.4	160.6	186.3	115.5	221.5	247.6	176.3
Q 2...	170.8	179.1	181.9	119.9	236.1	281.4	184.2
Q 3...	173.4	184.7	184.9	116.3	234.2	266.9	184.1
Q 4...	162.0	191.0	179.7	113.7	237.3	271.7	183.4
'54 Q 1...	163.5	191.2	182.3	121.1	239.2	275.9	186.0
Q 2...	158.7	146.2	170.1	119.5	239.0	264.4	167.2
Q 3...	156.2	159.0	162.8	101.0	241.1	240.8	160.1
Q 4...	150.2	142.6	165.0	100.8	240.5	264.5	160.5
'55 Q 1...	146.0	123.4	176.3	102.6	240.8	269.1	156.1
Q 2...	154.9	152.6	183.8	118.8	241.3	267.2	170.0

California, Average Highway Prices, Highway and Bridge Price Indexes

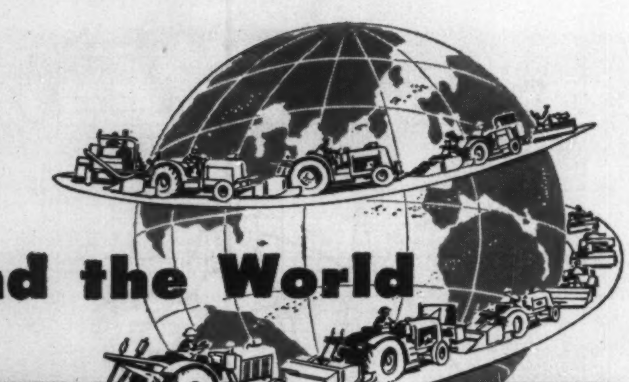
									Price Indexes	
Year	Rdwy excav $/cy	Crush run base $/t	Plant mix surf $/t	Asph conc pave $/t	PCC pavement $/cy	PCC structures $/cy	Bar reinf steel $/lb	Structural steel $/lb	Hwy const '40 =100	Bridge const '39-'40 =100
1940.......	$0.22	$1.54	$2.19	$2.97	$7.68	$18.33	$0.040	$0.083	100.0	99
1941.......	0.26	2.31	2.84	3.18	7.54	23.31	0.053	0.107	125.0	122
1946.......	0.41	2.45	4.00	4.68	9.48	37.38	0.060	0.099	179.7	197†
1948.......	0.55	2.43	4.30	5.38	13.04	49.86	0.092	0.126	216.6	229†
1949.......	0.49	2.67	4.67	4.64	12.28	48.67	0.096	0.117	190.7	199†
'50 Q 1....	0.34	2.22	3.65	3.74	.....	40.15	0.077	0.081	160.6	177
2....	0.40	2.13	4.48	3.74	10.86	43.03	0.080	0.105	180.0	195
3....	0.41	2.32	4.25	5.50	10.91	44.34	0.093	0.131	189.2	212
4....	0.42	2.81	4.64	4.61	12.55	43.18	0.098	0.120	194.8	218
'51 Q 1....	0.45	3.07	4.06	5.22	11.71	46.38	0.103	0.206	215.4	243
2....	0.63	3.88	4.56	4.63	12.93	51.50	0.105	0.166	238.3	250
3....	0.56	2.88	4.59	3.90	12.41	46.14	0.107	0.165	221.9	256
4....	0.66	2.91	5.66	4.89	12.71	49.38	0.105	0.169	245.4	253
'52 Q 1....	0 56	3.25	4.88	4.77	14.25	47.46	0.094	0.152	224.8	239
2....	0.53	3.19	5.29	4.13	14.20	49.12	0.091	0.143	224.4	236
3....	0.55	2.61	5.49	4.60	12.80	48.21	0.094	0.132	221.2	239
4....	0.66	2.68	4.97	.....	12.53	48.45	0.094	0.128	226.2	223
'53 Q 1....	0.45	2.48*	5.27	4.46	12.47	53.19	0.098	0.150	218.3	243
2....	0.50	2.07	5.38	4.59	13.06	52.68	0.091	0.132	217.5	224
3....	0.54	2.15	5.30	4.82	13.78	49.23	0.092	0.129	218.0	231
4....	0.48	2.11	4.74	4.47	14.77	53.41	0.105	0.139	216.7	235
'54 Q 1....	0.45	2.28	4.23	4.78	14.89	47.52	0.092	0.126	199.4	221
2....	0.38	2.09	4.29	5.18	14.28	47.12	0.093	0.114	189.0	217
3....	0.43	1.85	4.68	7.00	12.63	49.59	0.095	0.167	207.8	220
4....	0.35	1.78	4.83	.....	13.13	46.08	0.094	0.135	192.2	213
'55 Q 1....	0.39	1.69	4.55	.....	13.44	40.66	0.095	0.140	189.3	217
2....	0.42	1.99	5.39	.....	14.46	51.36	0.098	0.136	212.4	237

† average of quarterly values   * untrdt rock base substituted for crusher run at this point

The bridge price index is based on these items, quantities and weighted average 1939-40 prices:

Items	Quantities	1939-40 prices	Items	Quantities	1939-40 prices
Structure excavation..cy	156,286	$1.560	Misc iron and steel...lb	766,630	$0.138
Cl "A" portl cmt concr,			Bar reinf steel.......lb	35,958,000	0.040
structure...........cy	176,634	18.420	Furn steel piling......lf	79,329	1.790
footing block.......cy	12,774	12.040	Furn concr piling......lf	146,861	1.600
Struct steel,			Driving steel piling...ea	2,313	25.290
plate girder.........lb	5,810,000	0.077	Driving concr piling...ea	3,781	40.840
rolled beam.........lb	4,953,000	0.063	Steel bridge railing....lf	21,709	5.930
truss...............lb	7,884,000	0.099	Concr bridge railing...lf	42,976	1.910

On YOUR Streets and Highways . . . And all Around the World



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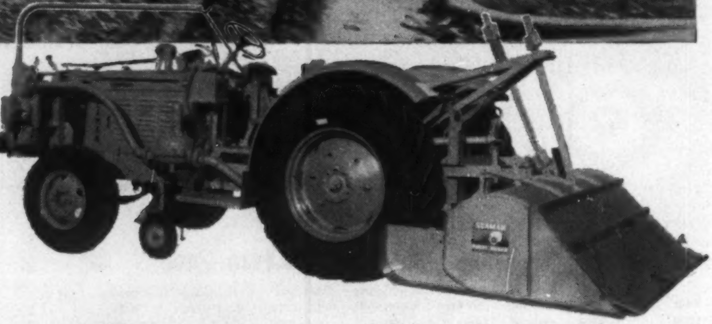

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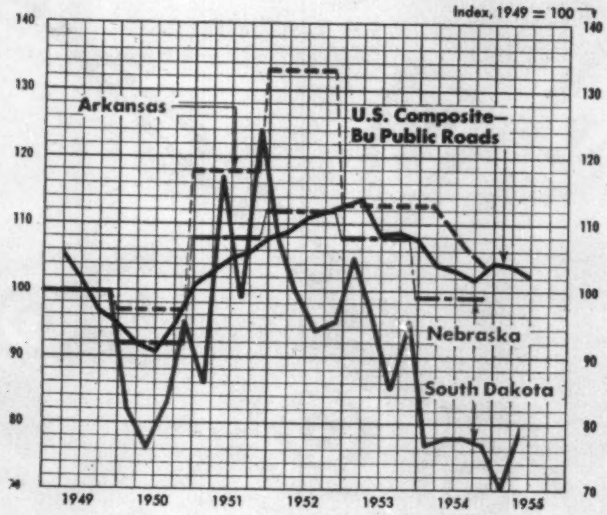


South Dakota, Average Unit Prices and Price Index

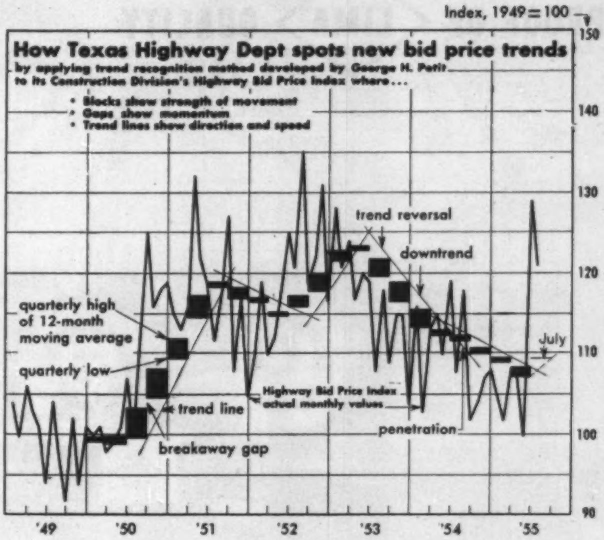
	Roadway excav. $/cy	Cr. grav. surf. $/t	Liq. asph. $/gal	Plt. mix bit. surf. $/t	Conc. Cl A $/cy	Reinf. steel $/lb	Struct. steel $/lb	Composite Index '40=100
1940......	$0.120	$0.59	$0.078	$1.49	$19.11	$0.044	$0.050	100.0
1941......	0.128	0.64	0.087	.....	19.52	0.049	0.054	107.9
1942......	.....	0.92	0.131	.....	.....	.....	.....	159.8
1943......	0.299	1.06	0.117	.....	21.62	0.061	0.400	197.9
1944......	.....	0.88	0.096	.....	.....	.....	.....	138.5
1945......	0.270	1.21	0.106	.....	38.69	0.078	0.096	202.7
1946......	0.214	1.13	0.101	2.91	38.49	0.085	0.095	177.6
1947......	0.235	1.35	0.140	3.49	46.22	0.113	0.128	212.2
1948......	0.246	1.40	0.169	3.92	53.26	0.129	0.149	230.5
1949......	0.197	1.40	0.159	3.83	54.01	0.125	0.135	217.0
'50 Q 1...	0.166	0.93	.....	.....	53.37	0.115	0.137	177.8
2...	0.171	0.88	0.139	2.17	49.54	0.114	0.135	167.5
3...	0.174	0.97	0.135	2.86	58.21	0.127	0.141	179.5
4...	0.199	1.05	0.111	3.00	51.33	0.136	0.681	206.8
'50...	**0.175**	**0.95**	**0.135**	**2.74**	**53.13**	**0.123**	**0.139**	**176.3**
'51 Q 1...	0.187	1.12	0.146	3.35	57.21	0.154	0.160	189.3
2...	0.418	1.17	0.151	4.04	.....	.....	.....	254.6
3...	0.209	1.29	0.158	3.92	66.10	0.137	0.162	217.0
4...	0.367	1.05	0.146	.....	64.03	0.152	0.500	268.0
'51...	**0.271**	**1.21**	**0.154**	**3.94**	**63.95**	**0.146**	**0.164**	**229.4**
'52 Q 1...	0.231	1.51	0.161	.....	53.39	0.149	0.152	233.9
2...	0.263	1.10	0.151	3.25	56.81	0.133	0.155	216.6
3...	0.246	0.97	0.147	2.63	55.30	0.148	0.170	204.0
4...	0.218	1.31	0.135	2.54	55.47	0.143	0.178	206.5
'52...	**0.242**	**1.18**	**0.146**	**2.89**	**55.37**	**0.141**	**0.160**	**212.6**
'53 Q 1...	0.309	1.07	0.142	4.21	62.91	0.115	0.450	227.1
2...	0.259	1.19	0.139	2.54	52.57	0.136	0.160	210.0
3...	0.186	1.20	0.138	2.01	47.39	0.138	0.143	186.4
4...	0.258	1.13	0.128	2.49	52.99	0.117	0.149	206.8
'53...	**0.215**	**1.15**	**0.138**	**2.63**	**51.54**	**0.129**	**0.147**	**197.1**
'54 Q 1...	0.157	1.03	0.120	2.37	46.15	0.110	0.168	166.9
2...	0.163	0.94	0.126	2.34	49.62	0.118	0.155	169.5
3...	0.164	0.93	0.120	2.24	51.75	0.127	0.133	168.6
4...	0.189	0.91	0.113	2.16	49.62	0.121	0.135	166.7
'54...	**0.171**	**0.95**	**0.121**	**2.26**	**49.23**	**0.119**	**0.146**	**168.6**
'55 Q 1...	0.162	0.80	0.120	2.01	49.33	0.109	0.146	154.9
2	0.176	0.95	0.129	2.52	47.79	0.119	0.169	172.8

Index Record 1919–1939

Year		Year		Year		Year	
1919......	286.3	1925......	158.2	1930......	142.2	1935......	117.3
1920......	341.8	1926......	144.7	1931......	127.2	1936......	138.4
1921......	282.4	1927......	149.2	1932......	113.5	1937......	112.4
1922......	162.0	1928......	145.3	1933......	102.4	1938......	95.5
1923......	193.7	1929......	150.6	1934......	125.9	1939......	90.0
1924......	175.5						

• **South Dakota**'s highway price index is based on seven bid items and is corrected for an upward bias that could be caused by substantial changes over the years in their relative quantities. This is probably the most sophisticated index of those included in this section.

The South Dakota Highway Commission uses "Fischer's Ideal Index" formula for computing its composite index. This is the root mean square of two weighted aggregate type indexes, the difference between these two indexes being in the percentage weights applied to each bid item.



In the first aggregative index, the percentage weights are based on average quantities contracted for during the four years 1950–53. These average quantities are multiplied by the average unit price for each item in 1940 to get a value weight for each item. These value weights are then converted into percentage weights based on the sum of the value weights for all of the items.

Next, the average bid prices of contract items for each period (annually 1919-49 and quarterly from 1950 to date) are reduced to relatives of the 1919 base year prices. These price relatives are then multiplied by the percentage weights and summed up to get the composite index for each period.

The second aggregative index is computed in a similar way except that two additional sets of percentage weights are computed from value weights in two other periods. Average annual quantities for the years 1923-26 are used to compute weights to get the price index for the years 1919-30. Likewise, average annual quantities for the 1937-40 period are used to compute weights and the price indexes for the years 1931-45. The same weights used for the first aggregative index also serve the second index but are used only for the period 1946 to date and, in the opinion of the Highway Commission, can probably be used for a number of years to come.

• **Texas** has revised its highway bid price index since ENR first described it (ENR Oct. 7, 1954, p. 123). The new index is calculated by re-figuring a project which cost $100,000 at the average prices and quantities of highway jobs let in the five-year period 1949-53. The old index was based on 1949 only.

The Highway Department feels that the broader base of 1949-53, which draws on a wealth of data representing more than $500 million in highway construction, gives the Department a better picture of the price trend.

The chart above shows how Texas adapts for its own use the method of recognizing cost trends originally developed by George H. Petit of Hartford, Conn. (ENR Sept. 4, 1952, p. 98). This method uses the quarterly highs and lows of the 12-month moving average of the cost index to form blocks. These blocks show graphically the strength of the Texas highway cost movements from 1950 to date. When a block penetrates the trend lines connecting preceding blocks, it means that the cost trend is changing it's speed or direction. The third quarter '55 block is not complete, but the gap between the thin line at July and the top of the second quarter block points to a reversal of the '53-'55 downtrend in bid prices.

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says William Wortman, Stuttgart, Arkansas Contractor

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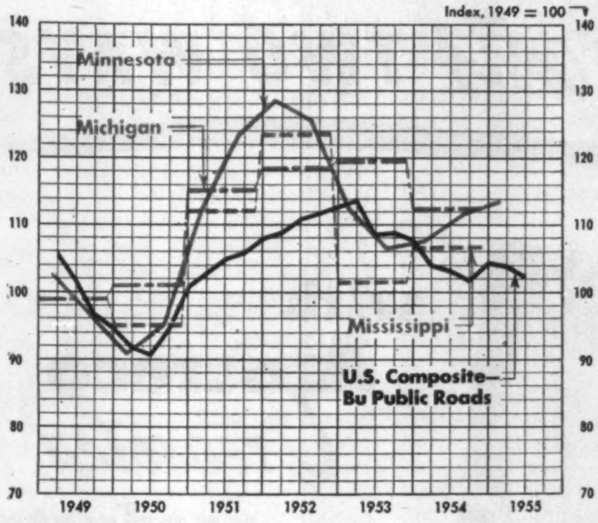


Mississippi, Average Unit Prices and Index—'37-'41—100

	Grading		Drainage	Cement concrete pavement				Bit pavement	
Year	Exc, uncl [a] $/cy	Topping [a] $/cy	B conc culv [b] $/cy	Plain cmt $/sy	7-5-7" RCC $/sy	8-6-8" RCC $/sy	9-6-9" RCC $/sy	Asph, prime $/gal	Cover mtls $/cy
1940	0.212	0.42	20.48	1.34	1.51	1.76	1.68	0.094	4.55
1941	0.250	0.42	25.61	1.71	2.20	2.58	2.50	0.072	....
1942	0.398	0.41	32.60	2.62	2.32	2.73	2.65	0.17	....
1943	0.267	1.26	27.98	3.25	2.44	2.88	2.81	0.179	6.00
1944	0.567	1.07	32.58	2.44	2.55	3.04	2.97	0.125	5.50
1945	0.671	1.21	38.66	2.58	2.95	3.47	3.36	....	....
1946	0.311	0.62	42.46	2.72	2.28	2.38	2.49	0.11	5.25
1947	0.345	0.72	47.80	3.96	2.26	3.00	3.17	0.139	6.55
1948	0.325	0.79	48.41	3.80	2.78	2.82	2.95	0.17	7.03
1949	0.312	0.71	45.852	3.64	2.99	3.269	3.291	0.155	7.076
1950	0.260	0.797	42.16	3.50	2.78	4.00	2.57	0.165	6.72
1951c	0.320	0.78	52.87	....	3.90	....	3.39	0.17	6.77
1952	0.410	0.82	50.43	....	3.83 [d]	....	....	0.17	6.85
1953	0.286	0.73	50.58	....	3.25 [d]	....	2.74 [e]	0.156	6.16
1954	0.307	0.84	47.72	....	2.79 [de]	3.61 [de]	3.18 [de]	0.162	6.59
Base prices	34.8%		8.2%	20.2%				9.6%	
'37-41	0.235	0.346	20.53	1.64	1.48	none	1.60	0.094	4.56
Sub wgt %	64.1	35.9	8.2	0.3	34.8	1.6	63.3	50.3	49.7

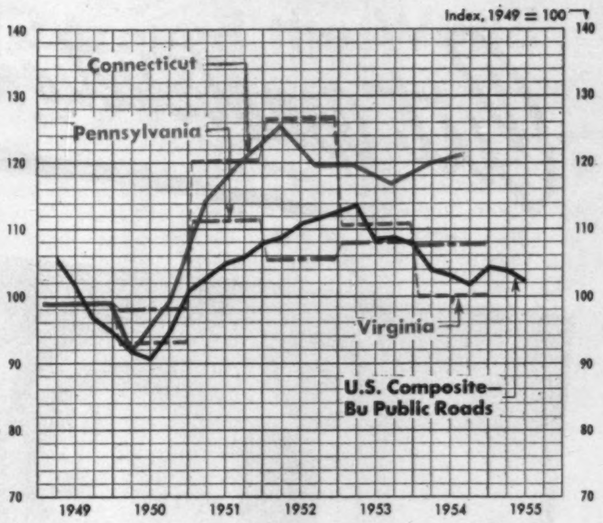
•a incl haul   •b incl D conc   •c first half of yr only   •d convrtd from 6" uniform

	Gravel		Structures						Com-
Year	Surf course $/cy	Stab aggr $/cy	Conc, B&C bri $/cy	Reinf stl, bri $/lb	Str stl $/lb	Timber, treated $/Mbm	Piling, timb [f] $/lf	Piling stl $/lf	posite Index 100
1940	2.18	1.56	23.36	0.04	0.05	124.88	1.04	....	100.36
1941	1.91	0.81	27.98	0.05	0.06	139.30	1.25	....	117.07
1942	3.00	....	34.27	0.067	0.09	249.73	1.88	....	158.79
1943	....	....	30.35	0.06	0.094	176.00	1.54	....	173.68
1944	2.43	....	33.17	0.143	0.098	200.00	2.29	....	196.18
1945	4.00	....	60.00	0.09	0.10	205.55	2.31	....	234.88
1946	2.85	4.25	41.22	0.07	0.085	211.11	2.34	3.21	163.42
1947	2.55	4.43	49.96	0.09	0.112	237.50	2.37	3.93	187.91
1948	3.08	4.41	54.66	0.11	0.127	276.04	2.63	3.71	197.10
1949	2.337	2.218	46.534	0.102	0.114	232.91	2.133	2.735	182.69
1950	2.385	3.86	43.945	0.098	0.119	222.12	1.98	3.319	175.48
1951*	2.70	3.74	55.07	0.123	0.144	275.26	2.27	4.10	206.49
1952	2.13	3.99	59.00	0.123	0.156	277.78	2.25	5.44	227.35
1953	2.94	4.09	48.80	0.11	0.134	253.31	1.90	3.98	186.75
1954	2.66	4.40	49.23	0.12	0.13	290.24	1.95	3.91	195.00
Base prices	4.1%		23.1%						
'37-41	1.98	1.67	23.04	0.043	0.052	121.27	1.19	1.80	100.00
Sub wgt %	32.1	67.9	44.9	12.4	27.1	1.5	6.6	7.5	

•e convrtd from 8" uniform   •f creo   •SI sub index

Virginia Highway Prices and Price Index

	Excavation		Surfacing			Structures		Com-
Year	$/cy	Sub-Index	$/cy	Sub-Index	Reinf. Steel $/lb	Struct. Conc. $/cy	Sub-Index	posite Mile Index
1937-41	$0.398	100.0	$1.012	100.0	$0.0494	$22.13	100.0	100.0
1937	$0.29	102.8	$0.91	89.9	$0.0500	$19.90	92.3	95.2
1938	0.29	102.8	1.02	100.8	0.0480	21.10	95.7	100.4
1939	0.25	88.7	1.02	100.8	0.0460	22.40	99.5	96.1
1940	0.25	88.7	1.04	102.8	0.0468	21.05	95.0	95.8
1941	0.33	117.0	1.07	105.7	0.0562	26.20	117.4	112.5
1942	0.46	163.1	1.33	131.4	0.0700	35.88	157.8	149.1
1943	0.57	502.1	1.50	148.2	0.0660	39.23	167.9	172.4
1944	0.49	173.8	1.55	153.2	0.0700	42.58	181.6	167.2
1945	0.55	195.0	1.53	151.2	0.0700	45.93	193.5	176.9
1946	0.53	187.9	2.05	202.6	0.0790	49.36	209.6	198.9
1947	0.55	195.0	2.00	197.6	0.0940	54.39	233.9	205.1
1948	0.67	237.6	2.26	223.3	0.1110	56.58	249.1	234.5
1949	0.55	195.0	2.01	198.6	0.1040	50.92	225.9	203.6
1950	0.55	195.0	1.66	164.0	0.1051	52.30	231.3	190.8
1951	0.71	251.8	2.00	197.6	0.1400	74.88	326.6	247.1
1952	0.77	273.0	2.00	197.6	0.1457	78.52	342.0	258.4
1953	0.61	216.3	2.01	198.6	0.1279	66.07	290.1	226.2
1954	0.48	170.2	2.00	197.6	0.1229	60.39	267.7	203.8



Connecticut, Contract Price Index and Sub-Indexes, 1939 = 100.

Date	Structures	Grading drainage	Trunk line	Concrete pavement	Town aid	Com-posite
1939	100.00	100.00	100.00	100.00	100.00	100.00
1940	93.76	94.19	92.78	98.54	86.41	93.93
1941	128.27	110.00	115.14	106.92	108.94	116.66
1942	139.83	130.00	156.21	129.89	142.75	141.06
1943	......	......	......	......	......	......
1944	......	......	......	......	......	......
1945	138.65	175.09	160.97	138.04	168.62	151.47
1946	163.34	177.27	192.20	132.95	207.09	170.08
1947	180.34	217.98	193.44	147.76	234.24	186.44
1948	228.17	231.36	198.27	198.31	190.28	211.81
1949	196.49	184.51	171.42	190.96	163.09	184.64
Jun '50	174.09	182.77	166.05	167.95	160.65	170.82
Dec '50	195.10	197.82	173.02	184.15	163.36	184.98
Jun '51	235.69	234.30	179.83	213.20	193.70	213.13
Dec '51	252.43	239.35	185.82	226.63	195.51	223.70
Jun '52	267.63	249.80	191.92	221.24	212.13	231.91
Dec '52	243.75	234.06	192.07	216.57	216.61	221.45
Jun '53	239.88	232.88	194.06	221.70	212.35	221.22
Dec '53	235.74	225.04	191.60	216.46	207.25	216.74
Jun '54	243.38	228.84	195.22	220.31	210.78	221.75
Dec '54	244.96	230.03	198.27	222.94	214.08	224.01

Pennsylvania, Weighted Average Unit Prices and Index

	Excavation					Concrete			
Year	Cl 1 $/cy	Cl 2 $/cy	Cr aggr base 8" $/sy	Bit surf DP-1 $/sy	RCC pvmt 9" $/sy	Cl A $/cy	Cl B $/cy	Reinf steel bars $/lb	Annual Index '40 = 100
1935	$0.494	$1.470	$0.736	$0.561	$2.729	$18.660	$15.167	$0.041	...
1936	0.555	2.060	0.784	0.646	2.556	20.08	16.53	0.044	...
'37 H1	0.563	2.445	0.920	0.749	2.536	21.99	18.169	0.053	...
H2	0.480	1.724	0.820	0.692	2.667	18.82	17.280	0.051	...
'38 H1	0.549	1.767	0.775	.....	2.951	20.738	16.667	0.048	...
H2	0.397	1.635	0.640	0.756	2.344	20.039	14.843	0.039	...
'39 H1	0.571	1.960	0.739	.....	2.740	20.43	15.68	0.046	...
H2	0.474	1.640	0.701	.....	2.430	20.96	17.68	0.047	...
'40 H1	0.449	1.779	0.799	0.734	2.586	22.151	18.059	0.044	...
H2	0.417	1.680	0.808	0.695	2.515	22.522	17.601	0.045	100
'41 H1	0.471	1.941	0.870	0.700	2.674	24.65	19.690	0.052	...
H2	0.560	2.446	0.919	0.779	2.715	27.642	20.642	0.057	111
'42 H1	0.622	3.403	1.108	1.084	.....	29.391	29.549	0.061	...
H2	0.866	3.500	1.200	1.102	.....	32.975	25.163	0.073	138
'43 H1	0.927	4.872	1.271	.....	.....	39.088	34.101	0.061	...
H2	0.779	2.653	1.394	.....	.....	38.405	31.076	0.067	157
'44 H1	0.647	2.943	1.184	.....	3.111	40.00	30.506	0.071	...
H2	0.604	3.234	1.248	.....	3.075	36.81	26.882	0.056	133
'45 H1	1.436	2.850	1.409	.....	3.835	26.105	22.484	0.069	...
H2	0.916	3.940	2.681	1.200	3.258	44.108	36.159	0.082	167
'46 H1	0.833	3.308	1.667	1.007	3.796	48.785	41.397	0.079	...
H2	0.948	3.844	1.752	1.284	3.995	44.397	37.776	0.074	171
'47 H1	1.095	4.003	1.878	1.305	4.299	52.448	43.836	0.090	...
H2	1.087	6.257	1.919	1.160	4.815	50.772	42.869	0.103	201
'48 H1	1.002	4.137	1.913	1.253	4.801	64.605	51.285	0.111	...
H2	1.022	6.364	1.924	1.415	4.951	66.885	48.089	0.109	208
'49 H1	0.965	4.042	1.986	1.241	4.985	75.156	45.747	0.113	...
H2	0.834	3.823	1.771	1.199	4.744	54.13	40.820	0.108	193
'50 H1	0.713	3.089	1.676	1.211	4.674	49.093	38.971	0.100	...
H2	0.819	3.675	1.742	1.100	4.971	55.208	41.90	0.106	192
'51 H1	0.921	4.049	1.867	1.500	6.154	61.092	49.547	0.127	...
H2	0.851	3.866	1.913	1.422	5.518	56.353	46.452	0.121	216
'52 H1	0.880	3.722	1.716	1.409	4.923	54.554	48.097	0.117	...
H2	0.912	4.017	1.902	1.277	5.150	62.451	48.891	0.125	205
'53 H1	0.787	4.048	1.930	1.176	5.138	58.440	46.728	0.123	...
H2	0.918	3.941	1.760	1.151	5.216	70.220	46.606	0.123	209
'54 H1	0.826	3.356	1.907	1.258	5.088	49.685	46.903	0.119	...
H2	1.059	2.749	1.419	1.240	5.175	52.092	34.680	0.116	208
'55 H1	0.604	2.664	1.764	0.950	5.333	48.868	43.488	0.114	...

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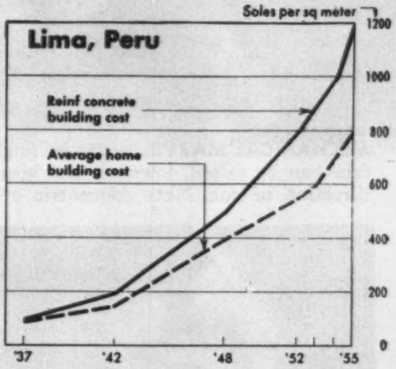
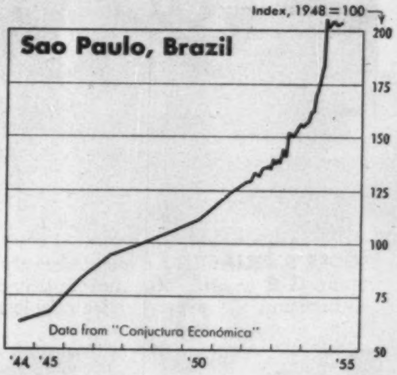
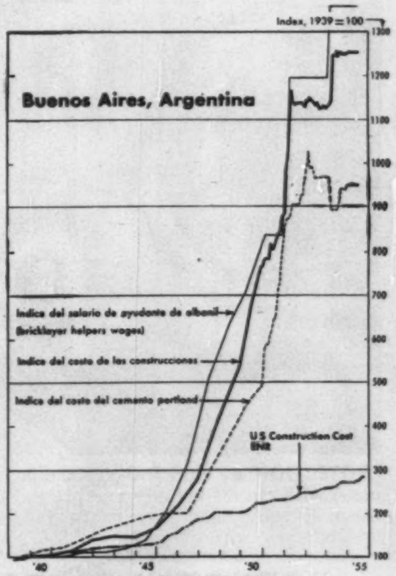
Construction Cost Trends Around the World

- **Anchorage, Alaska,** has a good supply of construction materials, unskilled and skilled labor. Utility and heavy construction is higher this year than last, but building construction is lower. At the time of ENR's report, carpenters were negotiating a new contract. They were asking for a 25-cent per hour raise but ENR sources estimated they would get from seven to ten cents more per hour, the same that other crafts have signed for this year.
- **San Juan, Puerto Rico,** has a good supply of construction materials and labor is plentiful. Construction activity is rising this year.
- **Bogota, Colombia,** is concerned about price increases for construction materials which have to be imported. Iron is short and the price is up sharply. The same is true for building equipment and construction machinery.
- **Buenos Aires, Argentina,** reports construction activity at a low ebb in June '55. While supplies of most construction materials were sufficient during the first half of this year, there were spot shortages of cement, broken stone and certain types of brick.
- **Caracas, Venezuela,** is suffering from a shortage of reinforcing steel which has forced the price up considerably. The supply of other construction materials is good except structural steel shapes which are not stockpiled here. The labor supply continues to improve, though skilled labor is still not plentiful.
- **Ciudad Trujillo, Dominican Rep.,** has an adequate supply of construction materials and there is no labor shortage. Point Four Schools are reported doing an excellent job in developing labor skills. Construction activity is running well above the '54 level largely because of work on the projected International Fair, tourist housing and government construction projects. Rentals show a better than normal return on investment. Construction costs have changed very little in the past year. Steady prices of materials imported from Europe, have helped keep materials costs at the same level as a year ago.
- **La Paz, Bolivia,** has severe shortages of construction materials. Black market purchases have become almost the normal way for contractors to get needed materials. Scarcities are limited to private work and are caused by lack of foreign exchange. Private construction is off 30% from last year. In contrast, public works have no problem because imports are state-sponsored. Public construction is budgeted 400% higher this year than last, with most of the expenditures going for the government industrial diversification program, the Cochabamba-Oruro-La Paz pipeline and another pipeline to the Chilean Pacific coast.
- **Lima, Peru,** reports little change in the construction picture from last year. Free exchange and no trade restrictions have resulted in a good supply of materials. A new cement plant with an initial capacity of 1,500 bbl/day has come into production south of Lima. Two more plants are now under construction in northern Peru. These plants will help the cement supply picture which has been so poor that cement had to be imported for large jobs. Unskilled labor is in good supply, but skilled is still short. Building continues brisk in Lima. Although construction workers' salaries are unchanged from last year, contractors have to pay 50% more for new government taxes, compensation insurance and other charges.
- **Montevideo, Uruguay,** reports materials in good supply excepting Portland cement. Housing construction has declined this year and building as a whole is estimated to be running about 20% below '54.
- **Santiago, Chile,** has a scarcity of nails and roofing materials while deliveries are spotty for cement, gravel, sand, steel and tiles. Unskilled labor is plentiful but skilled is scarce. Construction activity this year is running about 10% ahead of '54. Costs are up sharply—in the neighborhood of 70% higher than a year ago.
- **Sao Paulo, Brazil,** construction activity has declined in the first half of '55 and prices of construction materials softened. However, most materials prices are still higher than they were a year ago. Tight money and credit in Sao Paulo has slowed construction schedules and stretched out completion of many buildings which should have been completed many months ago.

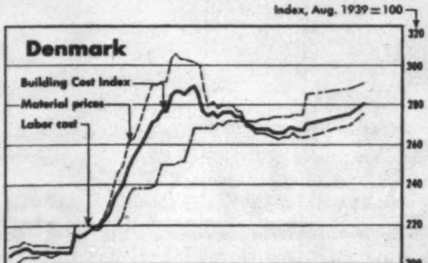


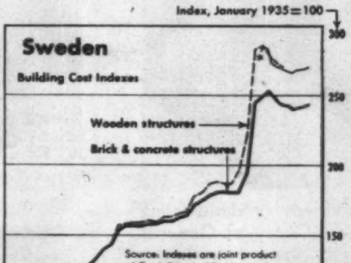


Data from "Conjuctura Económica"

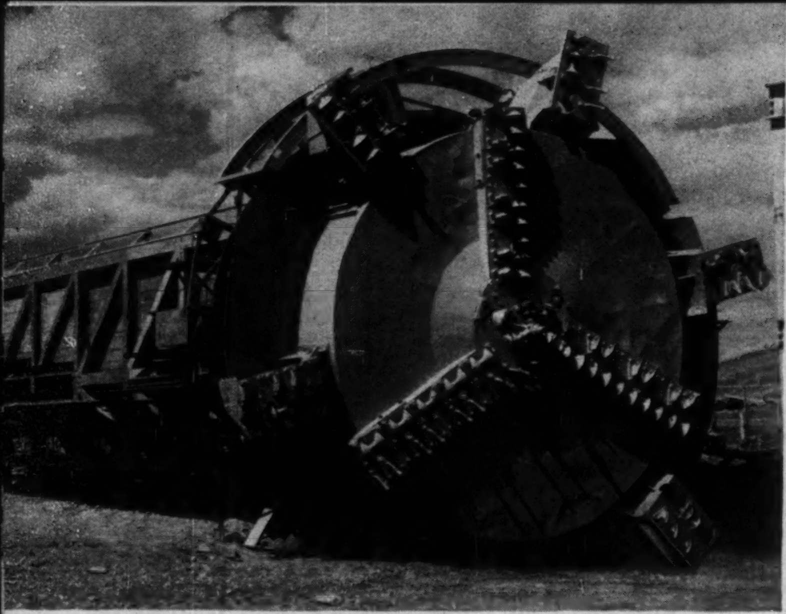


Source: Construcciones, published by Camara Argentina de la Construccion

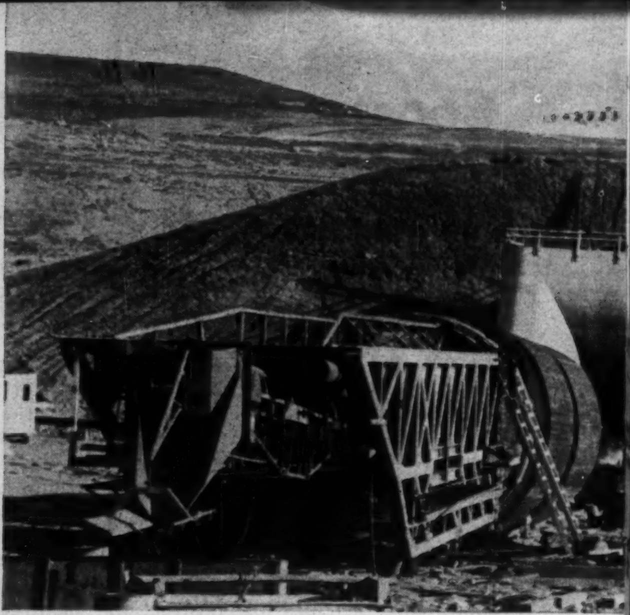




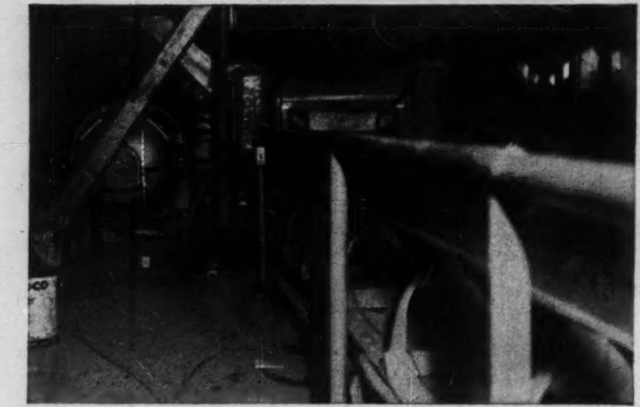
Source: Indexes are joint product of Gov't Board of Building and the construction industry



MECHANICAL MARVEL shows its mighty teeth. The 26-foot cutting face can be raised, lowered, and swung from side to side to alter direction of cut. Note concentric cutter heads and shale scoops.



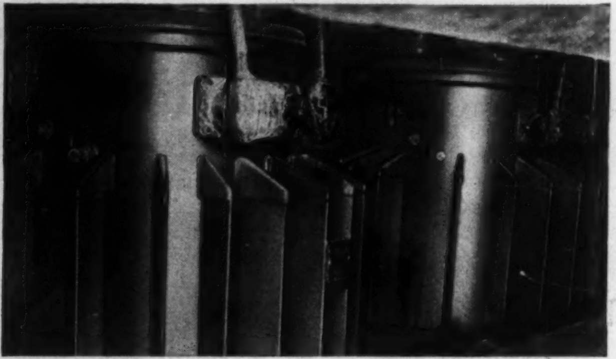
IMMENSITY OF JOB is suggested by view of six tunnel entrances bored in record time by new mole (above). Reinforced concrete tunnels average 1830 feet long.



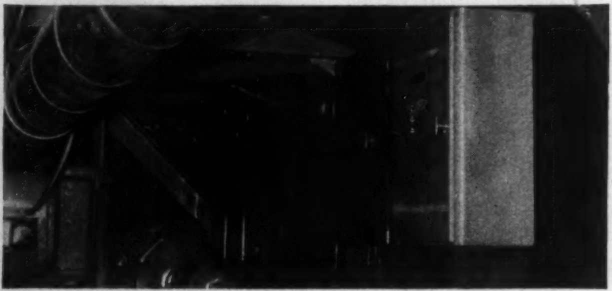
DIGGER'S RELIABILITY depends largely on performance of two 200-hp G-E wound-rotor motors driving cutters through gear mechanisms. Conveyor carries rubble to cars at rear of mole.

PROTECTION of electrical system is provided by dead-front panel with circuit breaker and ground relay. Compact General Electric equipment had to fit into tight space available.

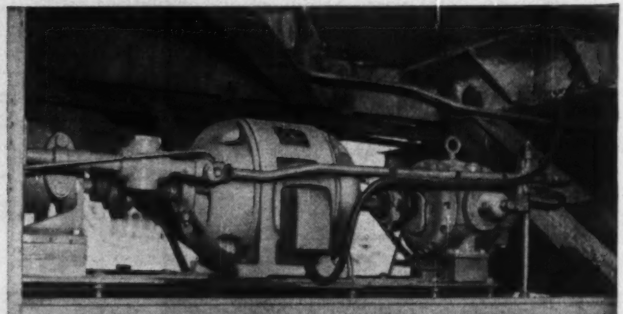
GENERAL ELECTRIC



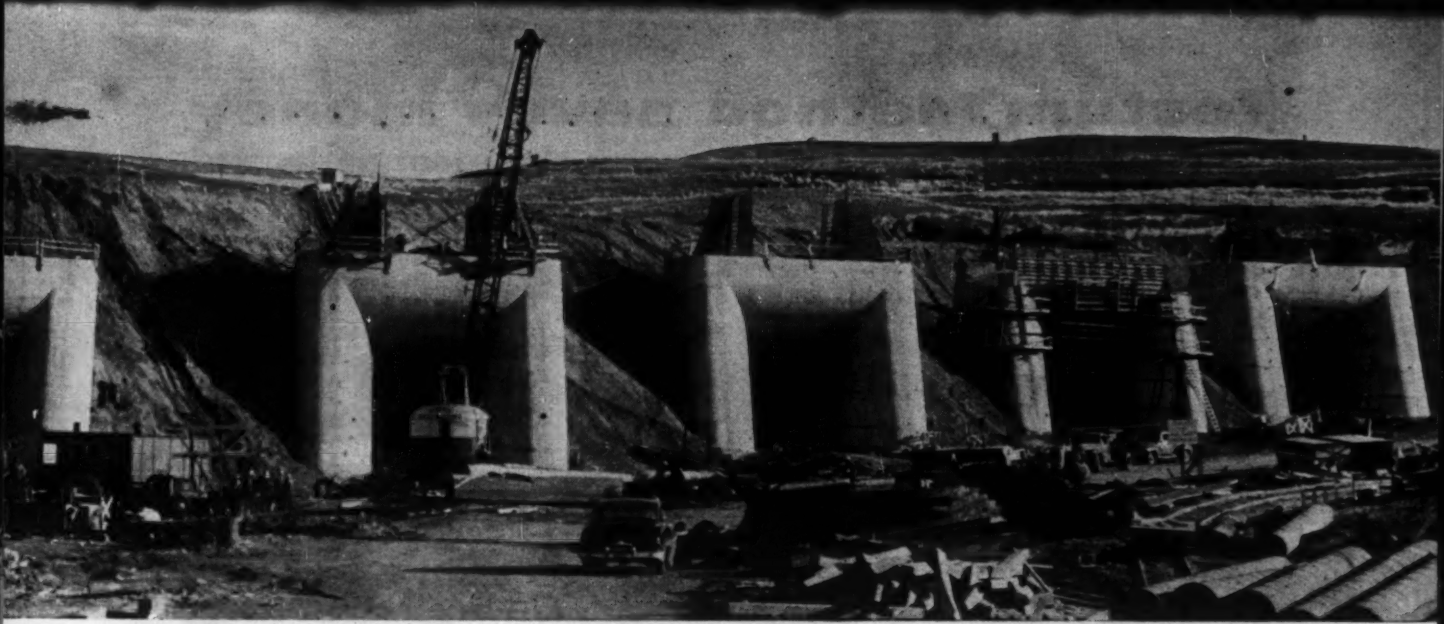
THREE COMPACT 167-kva G-E transformers in digger step down power supplied by cable from diesel-generator outside.



G-E MOTOR CONTROLLERS provide short circuit protection and permit centralized push-button control at operator's station.

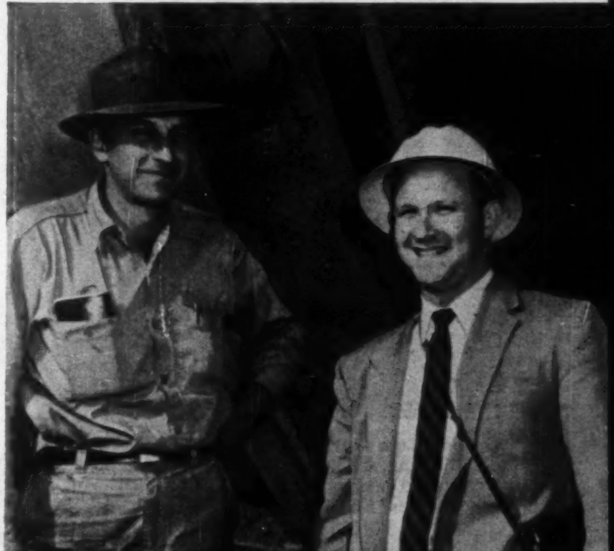


EXACT FORWARD MOVEMENT into rock face is accomplished with highly dependable G-E 25-hp motor furnishing power for hydraulically operated "feet" which propel mole on tracks.



Electrically powered by General Electric . . .

New giant "mole" chews tunnels 26′ wide over 4 times faster than previous methods



STANDING BY MOLE'S "FACE" are Bill Mittry of Mittry Constructors and Jim Dillman of G.E., who helped plan the new tunnel giant.

Mittry Constructors' tunnel digger illustrates high productivity possible with electrified tools

At the Oahe Dam of the Missouri River development near Pierre, S. D., an electrified tunnel digger 90 feet long has slashed tunneling time, costs and dangers. This imaginative use of electricity is even more successful than anticipated by its pioneering designers. James S. Robbins and Associates, Chicago, designed and built the "mole" for Mittry Constructors of Los Angeles under license from Goodman Mfg. Co., Chicago. According to Robbins, help from J. R. Porter, G-E engineer, greatly contributed to completing the digger two months ahead of schedule.

Problem was extremely difficult: How to dig six tunnels each over one-third mile long without exposing shale more than 30 days? Longer exposure would dry and dangerously weaken shale.

Solution was new electrified tool, which dramatically cut tunneling time to less than one fourth that needed by other methods. Digger was designed with two motor-driven concentric revolving cutter heads with large shale scoops on outside ring. Sections revolve in opposite directions to equalize cutting torque. Scoops dump shale through hopper to conveyor belt. Every four feet, a large I-beam is rammed into shale walls for support. Concrete is then pumped into forms to finish walls.

Down time has been practically zero. Despite conditions such as a constant humidity of 95% in the tunnels, G-E equipment has reliably powered this giant mole continuously and efficiently.

Electrified construction tools can pay off the same way for you too. Let your G-E Apparatus Sales representative show you how G-E equipment, backed by G-E engineering service, can raise tool productivity. Contact your nearest G-E Apparatus Sales office, or write General Electric, Sect. 664-37, Schenectady 5, N.Y.

Engineered Electrical Systems for Heavy Construction Tools

GENERAL ELECTRIC

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1 operation takes the place of 3

insulation

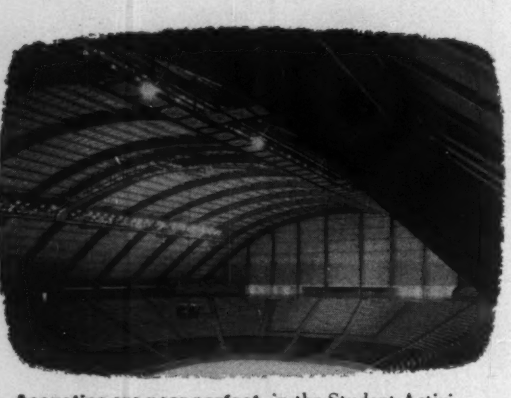
structural

sound control

A single product meets all "overhead" requirements for comfort, safety and economy

Now! The Tectum Method offers you an easy way to cut construction costs *without sacrificing quality or workmanship.* Tectum is more than a product—it's a *method!* In fact, Tectum will actually *improve* the quality of your job. There's a simple explanation for the superiority of Tectum. It does 3 jobs in 1. *First,* it's a roof deck; *second,* it's insulation; and, *third,* Tectum is acoustical. Not only is Tectum time-and-labor-saving, but Tectum's light weight (20 to 24 lbs. per cubic foot) lets you use lighter, more economical spans.

Tectum offers many other merits. Learn about them by writing for a copy of the Booklet "In the Market for a Quality Roof Deck?", or call your local Tectum distributor.



Acoustics are near perfect in the Student Activities Building, University of Maryland, insured by a combined deck and ceiling of 2″ Tectum plank nailed to steel purlins.
Architects: Hall, Border and Donaldson, Baltimore.
Contractor: Baltimore Contractors, Inc.
Erector: Irvin Prickett & Sons, Inc., Washington, D. C.

Tectum Division,
Peoples Research and Manufacturing Co.,
500 South 6th Street,
Newark, Ohio

Please send "In the Market for a Quality Roof Deck?"

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Firm ______________

City ______________ *Zone* ______ *State* ______

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ROOF DECKS

FOR PLANTS • COMMERCIAL BUILDINGS • INSTITUTIONS • HOMES

Construction materials prices around the world

Construction materials prices in national currency, fob city

North America and U. S. Territories

	Structural steel per cwt		Reinf. steel ¾ to 1-in., per cwt		Portland cement per bbl		Lumber, 2x4, S4S, per Mftbm 1st class pine		2nd class pine		Gravel 1½-in., per ton		Sand per ton	
City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Anchorage, Alaska	5.00[a]	4.85[a]	6.55[a]	6.40[a]	7.85[b]	8.05[b]	135.00[cd]	135.00[cd]	125.00[ce]	125.00[ce]	5.00[cfg]	5.00[cfg]	5.00[cfg]	5.00[cfg]
Honolulu, Hawaii	7.00[h]	7.00[h]	6.75[h]	6.75[h]	4.68	4.53	154.00[dp]	145.00[dp]	.....	.....	2.75	2.75	4.00	4.00
Montreal, Canada	8.00[iA]	8.00[iB]	6.65[i]	6.05[i]	2.86	2.96	155.00[d]	110.00[d]	92.00[j]	88.00[j]	2.20	3.00	2.25	2.25
New York, USA	7.48	7.20	6.85[m]	7.01	3.85[o]	3.70	125.00[cn]	113.00[cnG]	127.50[cdn]	120.00[cdnH]	2.85	2.85	1.90	1.90
Ottawa, Canada[c]	9.00[C]	9.00[C]	9.00[C]	8.00	4.84	4.88	240.00	200.00	100.00[e]	80.00[e]	1.50[f]	1.50[f]	1.00[f]	1.50[f]
San Francisco, USA	7.50	7.25	6.85	6.85	3.39	3.70	86.00[cr]	64.00[cr]	.....	.....	2.07	2.07	2.17	2.17
San Juan, PR[v]	9.00	240.00[s]	6.75	6.00	1.10[t]	1.10[t]	175.00[E]	145.00	125.00[wF]	115.00	3.56[u]	3.50[u]	2.44[u]	1.25[u]
Winnipeg, Canada[c]	9.00	8.70	7.55[x]	7.55[x]	1.17[y]	1.17[y]	95.00[e]	80.00[e]	90.00[e]	75.00[e]	3.75[f]	3.75[f]	3.75[f]	3.75[f]

[a] fob dock, Seattle [b] bulk, fob Anchorage—in paper bags, fob Seattle 6/55, 4.14; 6/54, 4.46 [c] delivered to job [d] Douglas fir [e] spruce [f] per cu yd [g] winter price '55 and '54, 7.00 [h] base price Honolulu, 20 tons and up [i] add dom., prov., & munic. sales taxes [j] spruce [k] base price [m] add 30¢ delivery; '55 price effective Aug 1 new base of Morrisville, Pa [n] truck lots [o] barge lots, and [p] No 1 and No 2, mixed, up to 25% No 2 [r] mill price, add freight [s] per short ton [t] per cwt [u] per, cu meter [v] delivered to site, Santurce [w] local lumber, 2nd cl 2" x 3", 116.75 per Mftbm [x] 1" diam—price for ¾" diam 7.85, 6/55 and 6/54 [y] per 87½ lb bag

Ranges [A] 7.50–8.00 [B] 7.25–8.00 [C] 8.00–9.00 [D] 5.50–6.00 [E] 150.00–175.00 [F] 118.00–125.00

Central and South America

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bogota, Colombia	800.00[a]	680.00[a]	600.00[a]	470.00[a]	80.00[o]	75.00[o]	.....	.....	6.00[c]	6.00[c]	14.00[e]	15.00[e]	13.00[ef]	13.00[ef]
Buenos Aires, Arg.	3,550[a]	3,550[a]	2,300[ab]	2,300[ab]	397[ag]	397[a]	29[hA]	29[hA]	25[i]	25[i]	145[e]	145[e]	40[ej]	40[ej]
Caracas, Venez.	600[ak]	600[akB]	600[ak]	450[ak]	110[ak]	110[ak]	400[l]	.....	370[el]	270[el]	14[e]	14[e]	15[e]	15[e]
Ciudad Trujillo, Dominican R.[m]	8.75	150.00[n]	8.00	7.50[C]	1.45[o]	1.45[o]	120[pD]	120[pD]	.....	.....	2.50[e]	3.16[e]	1.65[e]	1.85[e]
La Paz, Bolivia	.....	.....	260.00[s]	120.00[s]	1,115[t]	483.15[t]	280.00[u]	140.00[u]	200.00[uv]	120.00[uv]	4,000[e]	1,120[e]	4,000[h]	1,120[e]
Lima, Peru	3.80[sH]	3.80[sH]	2.94[s]	2.35[s]	14.45[t]	14.37[t]	4.05[y]	2.90[y]	3.50[yz]	2.80[yz]	34.00[ew]	34.00[ew]	25.00[e]	23.00[e]
Mexico City, Mex.	1,490[a]	1,429[a]	1,490[a]	1,490[a]	185.00[aa]	160.00[aa]	2,000	1,500	1,800	1,300	70.00[bb]	69.00[bb]	.....	.....
Montevideo, Uru.	.....	.....	480.00[aF]	460.00[aG]	70.00[a]	68.00[a]	600.00[cc]	600.00[cc]	500.00[dd]	470.00[dd]	10.00[m]	9.00[m]	2.70[m]	2.50[m]
Santiago, Chile	88,130[a]	54,770[a]	46,090[a]	24,730[a]	7,239[a]	4,093[a]	300,000[hh]	200,000[hh]	400,000[eehh]	230,000[eehh]	700[em]	470[em]	700[em]	470[em]
Sao Paulo, Brazil	18,000	7,000[ff]	780[ax]	960[ax]	98.50[gg]	73.10[gg]	500[ii]	560[ii]	2,300[de]	1,900[de]	210[h]	215[e]	140[e]	140[e]

[a] per metric ton [b] round iron [c] Local Oak, 20 x 20 cm, per meter [d] beams of peroba, 6 x 12 cm, 5 meters long [e] per cu meter [f] washed, rough—washed, fine 6/55 12.00; 6/54, 11.00—rock sand 6/55, 7.00; 6/54, 4.70 [g] 12/54 [h] 3" x 4" spruce, per sq meter 1" thick [i] 1" x 6" spruce, per sq meter 1" thick [j] fine sand—coarse sand 6/54 and 6/55, 111 [k] fob mill [l] saqui-saqui [m] delivered [n] per short ton [o] per 42.5 kg sack [p] long leaf pine [q] erected [r] fob whse, add 35¢/bbl for delivery [s] per kilogram [t] per 42 kg sack [u] per sq ft [v] price for "madera madra" 6/55, 180.00; 6/54, 80.00 [w] 1-in—2-in 6/55, 32.00; 6/54, 31.00 [x] ⅝-in diam [y] per bd ft [z] price of Tornillo 6/55, 3.40; 6/54, 2.80 per bd ft [aa] Tolteca [bb] blue, per truck load (3½ cu meters) [cc] tea pine [dd] Brazilian pine [ee] poplar (alamo) [ff] local, fabricated ready for erection [gg] national, per 50 kg sack—delivered to job, 102.00 [hh] per 1000 boards, 1" x 10" x 12' [ii] 3" x 3" x 4.27 meters, per doz

Ranges [A] 27–29 [B] 550–600 [C] 7.25–7.50 [D] 110–120 [E] 366–400 [F] 420–480 [G] 380–460 [H] 3.00–3.80

Europe

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Amsterdam, Nthlds.	475.85[a]	401.70[a]	487.50[a]	381.00[a]	55.50[a]	55.50[a]	.....	.....	249.00[bc]	229.00[bc]	7.17[a]	7.04[a]	5.02[a]	4.65[a]
Athens, Greece[d]	12[e]	8[e]	9[e]	7[e]	600[a]	500[a]	3,100[c]	2,500[c]	2,800[chh]	2,200[chh]	32[c]	28[c]	40[c]	36[c]
Bonn, W. Germany	431.00[a]	410.50[a]	441.25[a]	420.20[a]	73.00[a]	75.00[a]	245.00[c]	200.00[c]	225.00[c]	185.00[c]	6.00[c]	5.00[c]	7.00[c]	7.00[c]
Brussels, Belgium	4,850[af]	4,170[af]	5,175[af]	4,325[af]	659[ag]	659[ag]	37.50[chi]	36.00[chi]	32.00[chj]	30.00[chj]	87.50[ak]	85.00[ak]	32.50[al]	32.00[al]
Copenhagen, Den.	830.00[am]	625.00[am]	850.00[am]	625.00[am]	19.85[mn]	18.80[mn]	13.59[mo]	11.98[mo]	13.09[mo]	10.80[mo]	16.50[clq]	16.50[clq]	7.75[clr]	7.75[clr]
Geneva, Switzerland	52.00[amt]	52.00[amt]	60.00[amt]	52.50[amt]	5.40[mu]	5.40[mu]	250.00[mc]	200.00[cm]	.....	.....	9.00[v]	9.10[v]	11.50[vA]	9.10[v]
Helsinki, Finland	50[aw]	63[aB]	48[aw]	54[aC]	403[u]	403[u]	.....	.....	42,000[xD]	42,000[xD]	820[c]	820[c]	700[c]	700[c]
London, England	30/5/-[yqw]	30/5/-[yqw]	31/13/-[yrw]	32/1/-[yrw]	5/-/-[yz]	5/-/-[yz]	130[aaE]	125[aaF]	105[aaG]	100[aaH]	-21/-[bb]	-/18/-[bb]	-/22/3[bb]	-/20/6[bb]
Madrid, Spain[dd]	4,775[apeeI]	7,500[apJ]	5,214[apff]	3,200[apee]	456.89[ap]	416[ap]	2,800[cp]	2,800[cpK]	2,540[cp]	1,500[cpL]	38.00[cl]	40.00[clM]	24.00[cl]	17.00[clN]
Oslo, Norway	45.00[iijj]	40.10[iijj]	45.00[iipp]	40.00[iipp]	115.00[a]	115.00[a]	1,340[aagg]	1,170[aa]	1,270[aa]	1,100[aa]	16.00[bbT]	16.00[bbT]	11.50[bbU]	11.50[bbU]
Paris, France[m]	67,012[a]	68,380[a]	70,589[akk]	72,030[akk]	7,788[a]	7,711[a]	32,500[cll]	30,265[cll]	22,900[cll]	21,642[cll]	2,221[amm]	2,221[amm]	1,975[acc]	1,975[acc]
Rome, Italy	83[ep]	82[ep]	7,600[pe]	7,400[pe]	1,060[ms]	1,060[ms]	35,500[cm]	36,000[cm]	34,000[cm]	33,500[cm]	1,900[cmnn]	1,600[cmnn]	980[cm]	870[cm]
Vienna, Austria[m]	375.00[aO]	375.00[aO]	350.00[a]	350.00[a]	447.50[a]	447.50[a]	.....	.....	1,000[c]	800.00[c]	36.00[c]	36.00[c]	40.00[c]	40.00[c]
Stockholm, Sweden[m]	675[a]	595[a]	657.50[a]	560.00[a]	89.50[a]	90.60[a]	2.34[oo]	2.27[oo]	1.29[oo]	1.29[oo]	11.75[cP]	11.00[cQ]	10.75[cR]	10.00[cS]

[a] per metric ton [b] 1½" x 4" local equivalent [c] per cu meter [d] prices are in thousands of drachmae [e] per kilogram [f] add freight from basing pt [g] by barge [h] 2½" x 7" per running meter [i] Scandinavian [j] domestic [k] crushed, 8/20-in, fob barge on Meuse [l] fob quarry [m] delivered [n] per 4 bags = 170 kg [o] per cu ft [p] fob mill [q] whse price 6/55, 45/15/-; 6/54, 40/-/- [r] whse price 6/55, 44/3/-; 6/54, 40/-/- [s] per 100 kgs [t] carlots [u] per 50 kg bag [v] add 4.50 for delivery [w] approx [x] 6th cl pine timbers, untrimmed, per 4.672 cu meter equiv [y] per long ton [z] paper bags, delivered, 6 ton loads [aa] per 165 cu ft [bb] per cu yd [cc] coarse—fine 2,025 [dd] incl 7.4% tax [ee] black market 7.500 [ff] black market 50% more [gg] 2/3 sharp edges [hh] local equivalent 6/55, 2,500; 6/54, 2,000 [ii] per cwt over 10 metric tons, add extras—6/55 13 and 10mm, 1.35; 6mm, 3.80; 6/54 13mm, 0.50; 10mm, 0.75; 6mm, 2.00 [jj] whse price; mill price 6/55, 42.00; 6/54, 33.00 [kk] 2/5" diam [ll] 1" x 3 1/5", Vosges [mm] 1-in [nn] 2-3 cm—5 cm 6/55, 1,700; 6/54, 1,500 [oo] per lineal meter [pp] whse price, round soft steel—mill price 6/55, 37.00; 6/54, 32.00

Ranges [A] 9.50–11.50 [B] 58–63 [C] 52–54 [D] 40–42,000 [E] 110–130 [F] 105–125 [G] 95–105 [H] 90–100 [I] 3,070–4,775 [J] 7,200–7,500 [K] 1,620–2,800 [L] 900–1,500 [M] 35–40.00 [N] 14.00–17.00 [O] 350.00–375.00 [P] 10.75–11.75 [Q] 10.00–11.00 [R] 9.75–10.75 [S] 9.00–10.00 [T] 11.10–16.00 [U] 6.70–11.50

Africa and Middle East

City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Cairo, Egypt[o]	5,000[a]	4,200[a]	4,800[a]	4,000[a]	520[a]	520[a]	3,300	2,900	2,800	2,600	70[f]	60[f]	35[f]	30[f]
Casablanca, Morocco	55,050[a]	55,050[a]	49,750[ac]	49,750[ac]	6,415[ad]	7,000[ad]	27,270[ef]	27,270[ef]	25,250[fg]	25,250[fg]	700[fh]	750[fh]	220[fh]	230[fh]
Johannesburg, So. Af.	34/-/-[ij]	34/-/-[ij]	30/-/-[ik]	30/-/-[ik]	-/5/½[l]	-/4/10½[l]	-/4/-[bm]	-/4/-[bm]	-/2/5[bn]	-/2/5[bn]	-/14/-[p]	-/14/-[pA]	-/16/-[pq]	-/16/-[pq]
Beirut, Lebanon	0.45[rB]	0.60[rG]	0.39[rC]	0.35[rH]	63.50[a]	64.50[a]	235.00[fs]	225.00[fs]	190.00[ft]	155.00[ft]	7.00[f]	6.50[f]	4.00[f]	3.50[f]
Istanbul, Turkey	1,000[a]	750[a]	1,500[aD]	650[a]	100[auE]	80[auF]	360[fv]	315[fv]	280[fv]	235[fv]	22[fwI]	15[fwJ]	20[fwK]	12[fwL]
Tel Aviv, Israel	420[ae]	405[ae]	360[ae]	350[ae]	62.750[a]	58.750[a]	350[f]	240[f]	250[fx]	220[fx]	3.400[f]	3.240[f]	1.700[f]	1.40[f]

[a] per metric ton [b] 9" x 3" per running foot [c] 12mm diam [d] bulk, fob mill [e] imported [f] per cu meter [g] imported—local cedar 6/55, 19,000; 6/54, 18,000 [h] fob quarry [i] per short ton [j] imported 6/55, 40/-/-; 6/54, 37/-/- [k] imported 6/55, 34/-/-; 6/54, 32/-/+ [l] per 94 lb bag [m] clear Oregon [n] Oregon [o] prices in piasters [p] per cu yd [q] river sand for concrete—pit sand for mortar -/13/- [r] per kilogram [s] Swedish fir [t] Whitewood [u] fob plant [v] fob yard [w] delivered [x] European spruce 6/55, 185.00; 6/54, 164.00

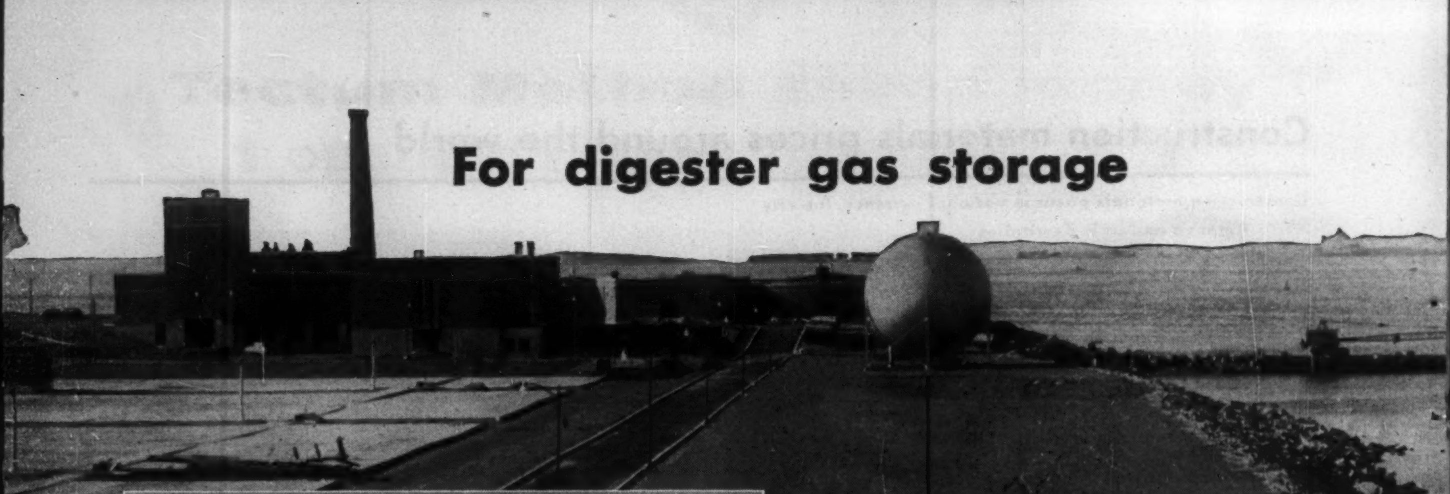
Ranges [A] -/10/- to -/14/- [B] 0.40–0.45 [C] 0.30–0.39 [D] 1,000–1,500 [E] 75–100 [F] 60–80 [G] 0.35–0.60 [H] 0.32–0.35 [I] 15–22 [J] 12–15 [K] 15–20 [L] 10–12

Asia and Australia

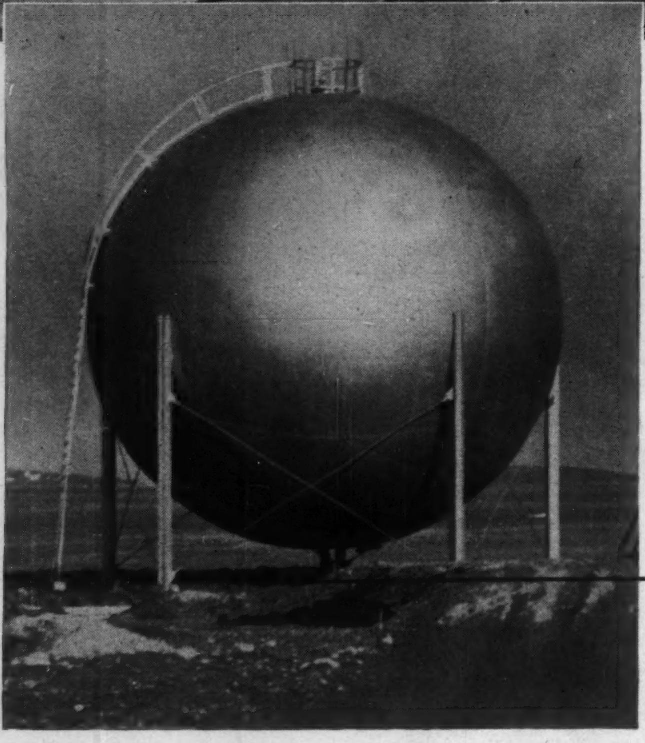
City	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bombay, India	500/-/-[a]	500/-/-[a]	550/-/-[a]	480/-/-[a]	105/-/-[a]	105/-/-[a]	15/-/-[bc]	12/-/-[bc]	10/-/-[bc]	9/-/-[bc]	40/-/-[de]	40/-/-[de]	36/-/-[e]	40/-/-[e]
Colombo, Ceylon	750.00[a]	750.00[a]	700.00[a]	700.00[a]	180.00[avA]	180.00[aA]	24.00[cfB]	24.00[cfB]	14.00[cg]	14.00[cg]	16.00[a]	16.00[a]	5.00[a]	5.00[a]
Karachi, Pakistan	615/-/-[a]	615/-/-[a]	765/-/-[a]	600/-/-[a]	76/-/-[a]	82/-/-[a]	7/8/-[c]	7/8/-[c]	6/12/-[ch]	6/12/-[ch]	80/-/-[ij]	80/-/-[ij]	80/-/-[i]	80/-/-[i]
Tokyo, Japan	40,000[k]	50,000[k]	35,000[k]	30,000[k]	8,000[k]	8,700[k]	4,000[l]	4,000[l]	3,500[l]	3,500[l]	6,700[m]	8,200[m]	4,700[m]	5,500[m]
Manila, PI	700[kC]	800[kD]	500[kE]	480[kF]	3.80[n]	3.80[no]	.....	.....	190[fG]	200[fH]	5.50[pI]	6.00[pJ]	5.00[pK]	5.00[pK]
Melbourne, Aust.	45/-/-[aq]	43/-/-[aq]	40/-/-[ar]	38/-/-[ar]	10/8/9[as]	10/8/6[as]	17/-/-[tL]	14/10/-[tM]	8/12/6[itN]	5/12/6[itO]	1/12/6[u]	1/9/10[u]	1/12/-[u]	1/8/6[u]
Wellington, NZ	3/-/3	3/-/-	3/1/-[w]	2/12/-[wP]	11/18/1[a]	13/-/-[aQ]	.....	.....	3/17/-[x]	3/15/3[x]	1/13/4[u]	1/4/-[u]	2/-/4[u]	1/15/-[u]

[a] per long ton [b] Indian teak [c] per cu ft [d] broken stone [e] per 100 cu ft [f] Red Lauan [g] local equivalent [h] Deodar 6/4/- [i] hardwood [j] per 125 cu ft; [k] per metric ton [l] per koku, 1' x 1' x 10' [m] per ryutsubo, 6' x 6' x 6' [n] per 94-lb bag [o] black market 6.50 [p] per cu meter [q] imported 6/55, 68/-/- to 72/-/- 6/54, 51/10/- to 62/15/- [r] imported 6/55, 57/10/- to 63/-/-; 6/54, 49/-/- to 55/-/- [s] imported 6/55, 15/-/- to 16/12/6; 6/54, 14/10/6 to 17/3/- [t] kiln dried, per 100 board ft [u] per cu yd [v] price varies with local shortages, arrivals, currently Rs 180.00 [w] 7/8" rounds [x] Pinus or Rimu, per 100 board feet

Ranges [A] 130.00–180.00 [B] 20/- to 24/- [C] 500–700 [D] 650–800 [E] 330–500 [F] 370–480 [G] 170–190 [H] 180–200 [I] 4.10–5.50 [J] 5.00–6.00 [K] 4.50–5.00 [L] 13/17/6 to 17/-/- [M] 11/-/- to 14/10/- [N] 7/19/- to 8/12/6 [O] 5/4/- to 5/12/6 [P] 2/10/- to 2/12/- [Q] 9/2/- to 13/-/-



For digester gas storage



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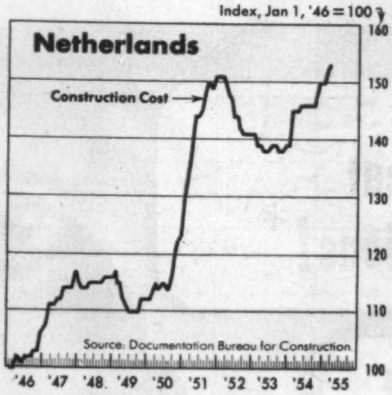
CHICAGO (3), 1216 First National Bank Bldg.
LOS ANGELES (48), ... 6399 Wilshire Blvd.
DES MOINES (8), 913 Tuttle Street
DALLAS (1), 1217 Praetorian Bldg.
SEATTLE . . . . 520 Lane Street
SANTA CLARA, CAL., 619 Alviso Road

Construction wages around the world

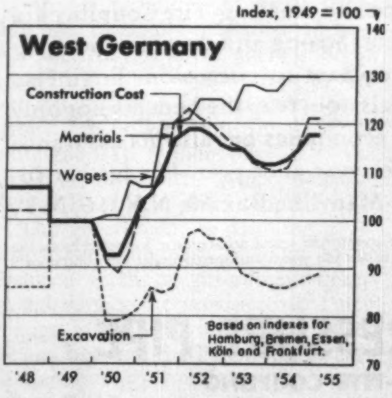


Source: Documentation Bureau for Construction

• **Amsterdam, Netherlands,** wage rates shown in the table are tariff-work rates. They are based on average piece-rates paid on new construction and include social charges. The building cost index shown in the chart is a weighted aggregate of the man-hours cost and materials cost for four one-family houses and four apartment blocks. Man-hours are based on 1938-39 and adjusted for changes in productivity. Productivity from January, 1946 to March, 1949 was estimated at 70% of the 1938-39 average and from April, 1949 on at 80% of the 1938-39 average.

• **Athens, Greece** has an abundant supply of construction materials. Both skilled and unskilled labor are plentiful.

• **Bonn, Germany** expects shortages of construction materials despite increased output. The construction industry believes shortages of materials and labor can be avoided only by extending the construction season through the winter months and hopes the government will place orders for winter delivery to help prevent supply bottlenecks. This year both unskilled and skilled labor are scarce but labor unions have balked at permitting an influx of Italian labor during the summer months because of the effects of the low wages. The indexes in the chart below are supplied by the Ministry for Housing Construction.



Based on indexes for Hamburg, Bremen, Essen, Köln and Frankfurt.

Rates per hour in national currency June 1954 and June 1955

North America and U. S. Territories

City and Country	Exch. rate June '54 per $1 US	Common Labor Heavy constr. 6/55	6/54	Common Labor Building 6/55	6/54	Bricklayers 6/55	6/54	Carpenters 6/55	6/54	Structural Ironworkers 6/55	6/54
Anchorage, Alaska..[a]	$1.00	$3.285[h]	$3.22	$3.25[h]	$3.185	$4.39[h]	$4.32	$3.69[h]	$3.565	$4.035[h]	$3.965
Honolulu, Hawaii..[a]	1.00	1.46	1.46	1.46	1.46	2.40	2.40	2.10	2.10	2.50	2.50
Montreal, Canada.[ab]	0.98⅜	1.25[c]	1.25[d]	1.25[c]	1.25[d]	2.00[c]	2.00[d]	1.80[c]	1.80[d]	1.90[c]	1.90[d]
New York, USA....[a]	1.00	2.415[e]	2.415[e]	2.415[e]	2.415[e]	4.15[f]	4.15[f]	3.57[f]	3.57[f]	3.975[e]	3.975[e]
Ottawa, Canada....[a]	0.98⅜	1.00	1.10	1.00	1.10	2.10	2.00	1.82	1.75	2.05	2.00
San Francisco, USA[a]	1.00	2.275[e]	2.125[e]	2.275[e]	2.125[e]	3.65[f]	3.475[f]	3.005[e]	2.905[e]	3.175[e]	3.075[e]
San Juan, PR.....[a]	1.00	0.75	0.65	0.50[g]	0.35[g]	1.00	1.00[A]	0.90	0.90[B]	1.00	1.00[A]
Winnipeg, Canada...	0.98⅜	....	1.25	....	1.05	....	2.10	....	1.90	....	1.95

•[a] 8-hr day •[b] negotiating •[c] plus 8% fringe benefits •[d] plus 2% vac pay •[e] incl fringe benefits •[f] 7-hr day •[g] min rate; actual rate over 50¢/hr •[h] plus 3¢ Aug. 1 Ranges •[A] up to $1.00 •[B] 0.85–0.90

Central and South America

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bogota, Colombia..[ab]	2.50 Pesos	0.90	0.90	0.71	0.71	0.71	0.71	1.00	0.90	1.80[A]	1.26
Buenos Aires, Arg[acde]	14.00 Pesos	41.00	41.00	41.00	41.00	51.00	51.00	51.00	51.00	....	....
Caracas, Venez...[acf]	3.35 Bs.	14.00	11.85	11.70	11.70	25.70[B]	25.70[B]	25.70[C]	25.70[C]	25.70[B]	25.70[B]
Ciudad Trujillo, Dominican R....[a]	RD $1.00	1.50[c]	1.50[c]	1.50[c]	1.50[c]	4.50[co]	4.50[co]	4.50[cgD]	4.50[cgD]	..[h]..	6.00[cE]
La Paz, Bolivia....[ai]	Bs. 2,700*	445	200	186	82	233	115	350	152	371	162
Lima, Peru........[aj]	19.00 Soles†	28.30	28.03	24.14	23.90	40.37	39.98	40.37	39.98	45.90	45.45
Mexico City, Mex..[a]	12.50 Pesos	1.19[m]	1.00[m]	1.19[m]	1.10[m]	2.25	2.48	2.25	2.48	1.37[n]	1.24[n]
Montevideo, Uru..[ak]	3.33 Pesos**	1.40[m]	1.08[m]	1.36[m]	1.04[m]	1.70	1.50	1.70	1.50	....	....
Santiago, Chile....[al]	200 Pesos***	60.40	39.50	57.00	36.00	91.20	56.20	85.20	52.40	85.20	52.40
Sao Paulo, Brazil...[a]	CR $80.00♯	11.00	9.00	9.60	7.00	15.00	15.00[F]	18.00	15.00[F]	18.00	16.00[G]

•[a] 8-hr day •[b] incl 44% soc ins, etc. •[c] per day •[d] 44-hr week •[e] plus 80% for ins & other soc chgs •[f] incl 7th day pay & 15 days/yr vac •[g] master paid $30–$50 per mo •[h] 1.00 per cwt handled •[i] incl soc chgs •[j] incl soc ins, unemploy tax, comp ins, vac & other taxes •[k] plus soc chgs 33.01% •[l] incl soc chgs—6/55, 52%; 6/54, 51% •[m] peons •[n] remachadores, aver per hr •[o] master mason earns 5.00–8.00/day Ranges •[A] 1.00–1.80 •[B] 23.30–25.70 •[C] 21.00–25.70 •[D] 3.50–4.50 •[E] 5.00–6.00 •[F] 13.00–15.00 •[G] 14.00–16.00 * 6/54: Bs. 1,420 per $1 US ** 6/54: $3.16 per $1 US *** 6/54: 110 pesos per $1 US ♯ 6/54: Cr. $20.00 per $1 US † 6/54: 19.90 Soles per $1 US

Europe

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Amsterdam, Nthlds.[c]	3.80 Fl.	....	....	....	....	2.133	2.018	2.153[d]	2.038[d]	2.062	1.905
Athens, Greece...[aqb]	30,000 Drch.	80[A]	68[B]	65[C]	58[D]	130[E]	120[F]	150[G]	120[F]	130[E]	120[F]
Bonn, W. Germany.[a]	4.20 DM	2.01	1.90	1.81	1.71	2.12	2.00	2.12	2.00	2.12	2.00
Copenhagen, Den..[a]	6.92 Kr.	5.38[e]	....	5.38[e]	....	6.80[f]	6.49[g]	6.42[f]	5.81[g]	....	....
Geneva, Switz.....[a]	4.28 Sw fr.	2.53	2.47	2.53	2.47	3.05	2.95	3.17	3.07	3.08	2.95
Helsinki, Finland...[h]	231 markkaa	143	130	127	115	263[H]	250[I]	263[H]	250[I]	263[H]	250[J]
London, England...[a]	£-/7/-	-/3/7[t]	-/3/5	-/3/7[t]	-/3/5[u]	-/4/1½[t]	-/3/10½[u]	-/4/1½[t]	-/3/10[u]	-/3/11[st]	-/3/8[su]
Madrid, Spain.....[ai]	38.95 Pts.	3.79	3.72	3.79	3.72	4.90	4.80	4.74	4.65	4.90	4.80
Oslo, Norway......[j]	7.14 N. kr.	6.71	6.42	5.08	5.06	6.21	5.92	5.38	4.99	....	....
Paris, France.....[ak]	350 Fr	179	163	179	163	191	181[M]	195	185[N]	213	213[O]
Rome, Italy.......[al]	624.80 Lire	282.22	265.38	282.22	265.38	316.00	296.40	347.33	325.72	347.33	325.72
Vienna, Austria...[am]	26.00 Sch	6.20	6.20	6.20	6.20	7.15[n]	7.15[n]	7.45[o]	7.45[o]	6.80	6.80
Stockholm, Sweden.[b]	5.18 Kr.	6.00[J]	6.00[J]	6.00[J]	6.00[J]	8.00	8.00[L]	8.00	7.50[K]	6.00	6.00

•[a] 8-hr day •[b] per day •[c] incl soc chgs, based on "tariff-works" (piecework) rates •[d] incl 0.02 f per hr tool allow •[e] 6-day wk •[f] 3Q 1954 •[g] 3Q 1953 •[h] 46½ hr wk except Jul-Aug, 45 hrs; skilled pd on pcwk •[i] add 95% soc ins •[j] 48-hr wk, based on piecework •[k] incl soc chgs: 41.74% (except 44.19% for carpenters) •[l] incl soc chgs •[m] 4 days of 9½ hr, 1 day of 10-hr •[n] incl 0.10 tool allow •[o] incl 0.25 tool allow •[p] 8½-hr day, plus 5½ hrs Sat •[q] thous drachmae •[r] 46½-hr week except May-Sept 45 hrs •[s] approx •[t] add 12½% soc chgs •[u] add 11½% soc chgs Ranges •[A] 65–80,000 •[B] 58–68,000 •[C] 58–65,000 •[D] 48–58,000 [E] 120–130,000 •[F] 110–120,000 •[G] 120–150,000 •[H] 210–263 •[I] 200–250 •[J] 5.00–6.00 •[K] 6.50–7.50 •[L] 7.00–8.00 •[M] 181–201 •[N] 185–205 •[O] 201–213

Africa and the Middle East

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Cairo, Egypt......[abc]	34.643 Pi	40[A]	40[A]	30[B]	30[B]	100	100	100	100	80[D]	80[D]
Casablanca, Mor...[a]	3.50 Fr	75[cE]	73[cF]	75[cE]	73[cF]	165[C]	155[C]	144[C]	134[C]	165[C]	155[C]
Johannesburg, So. Af...........[h]	£-/7/2¼	-/1/5¾[de]	-/1/5¼[de]	-/1/5¾[df]	-/1/5¼[df]	-/7/9¼[ag]	-/7/9¼[ag]	-/7/9¼[ag]	-/7/9¼[ag]	....	....
Beirut, Lebanon....[a]	£3.22	0.95[G]	0.80[H]	0.75[I]	0.65[J]	1.25[K]	1.50[L]	1.85[M]	1.50[N]	1.50[L]	1.25[K]
Istanbul, Turkey....[i]	2.825 Lires	1.00[O]	0.85[P]	0.80[Q]	0.75[R]	1.50[N]	1.25[K]	2.00[S]	2.00[S]	2.20[T]	2.00[S]
Tel Aviv, Israel....[ab]	£0.556	....	....	7.460[j]	7.060	8.480	7.980	8.480[j]	7.980[j]	....	....

•[a] 8-hr day •[b] per day •[c] 10-hr/day max 50-hr wk to allow for time lost because of weather •[d] add housng levy, 0.06d per hr •[e] 9 1/5-hr day •[f] 8 1/5-hr day •[g] incl hol fund, benefit fund & comp •[h] min rates; actual higher due to shortage •[i] 10-hr day •[j] organized labor rates Ranges •[A] 30–40 •[B] 25–30 •[C] 80–100 •[D] 60–80 •[E] 57–75 •[F] 52–73 •[G] 0.80–0.95 •[H] 0.70–0.80 •[I] 0.65–0.75 •[J] 0.60–0.65 •[K] 1.00–1.25 •[L] 1.25–1.50 •[M] 1.25–1.85 •[N] 1.00–1.50 •[O] 0.75–1.00 •[P] 0.60–0.85 •[Q] 0.65–0.80 •[R] 0.60–0.75 •[S] 1.50–2.00 •[T] 1.80–2.20

Asia and Australia

City	per $1 US	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54	6/55	6/54
Bombay, India....[ab]	Rs 4/12/-*	-/8/-	-/8/-	-/6/-	-/6/-	-/12/-	-/12/-	-/12/-	-/12/-	1/4/-	1/4/-
Colombo, Ceylon...[ac]	Rs 4.74	0.32[g]	0.32	0.32[g]	0.32	0.41[g]	0.41	0.41[g]	0.41	0.41[g]	0.41
Karachi, Pakistan..[a]	Rs 3.335	-/6/-	-/6/-	-/4/9	-/4/6	-/13/-	-/12/-	-/13/-	-/12/-	-/12/-	-/11/-
Tokyo, Japan......[a]	360 Yen	66.00	66.00	54.00	54.00	84.00	84.00	77.50	75.00	81.00	81.00
Manila, PI........[a]	2.34 Pesos	0.50	0.50	0.50	0.50	1.25[A]	1.00[B]	1.25[C]	1.00[B]	1.25[A]	1.00[B]
Melbourne, Aust..[ade]	£-/9/-	21/17/3[F]	18/12/2[G]	21/17/3[F]	18/12/2[G]	22/15/-	21/3/3	21/18/2	20/8/5	....	....
Wellington, NZ...[adf]	£NZ-/7/1	10/13/4	10/3/6	10/15/8	10/9/11	11/19/8	11/13/5	11/12/8	11/6/8	11/10/9	11/4/7

•[a] 8-hr day •[b] per day •[c] minimum rates; larger firms pay more and provide mid-day meal worth 23 cents •[d] per 40-hr week •[e] incl paid holidays, statutory and unofficial additions—base rates, 6/55: common labor on heavy construction, 14/14/2; common labor on buildings, 14/4/2; bricklayers, 17/8/4; carpenters, 17/7/6; str ironworkers, 12/2/- to 18/10/3 •[f] minimum rates; many employers offer more •[g] now negotiating for 3 cents/hr increase Ranges •[A] 0.75–1.25 •[B] 0.75–1.00 •[C] 0.625–1.25 •[D] 18/-/2 to 21/17/3 •[E] 18/-/2 to 18/12/2 •[F] 18/-/2 to 21/17/3 •[G] 18/-/2 to 18/12/2 * 6/54 rate: Rs. 4/12/6 per $1 US

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Installation time cut beyond all expectations!*
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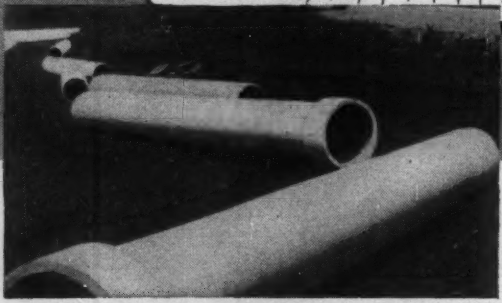
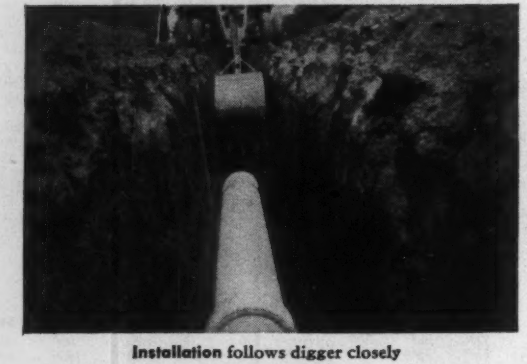
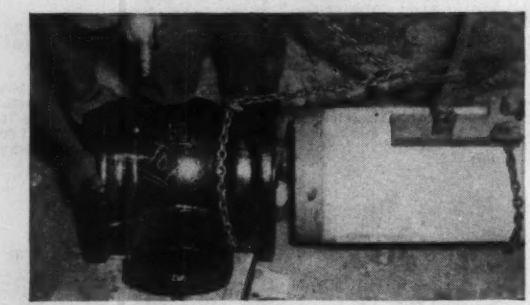


Easy handling, fast assembly



Installation follows digger closely



Ring-Tite Fittings, too—You can join pipe directly to fittings, valves and hydrants embodying the Ring-Tite design . . . no special tools needed, no poured joints

You, too, can complete your water-line jobs ahead of schedule and at lower installed cost. Transite Pressure Pipe with the new Ring-Tite Coupling gives you easier handling, simplified and speedier assembly, protects your job with a positive joint seal. Installation can go forward under adverse terrain and weather conditions.

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Transite Pressure Pipe and the Ring-Tite Coupling are made of asbestos-cement. Strong and durable, they cannot rust; are highly resistant to corrosion. Engineers and water works officials, too, reap the benefits not only of Transite's installed economies but also its assurance of operating economies year after year. For further information write Johns-Manville, Box 60, N.Y. 16, N.Y.

*Excerpt from actual field report: "Exceeded by far the installation speed anticipated under job conditions."

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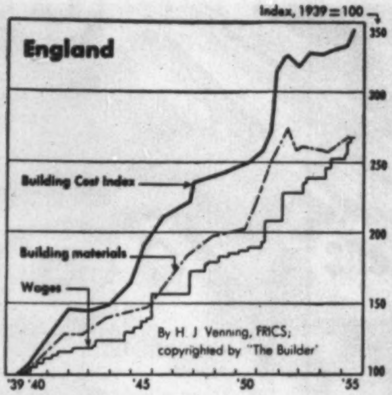
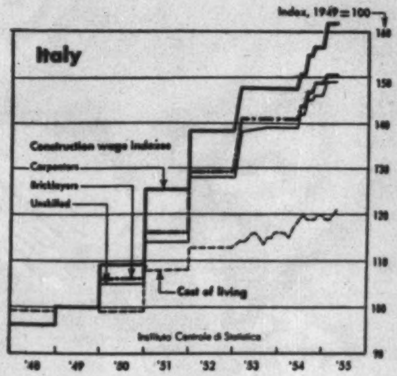
Johns-Manville TRANSITE PRESSURE PIPE

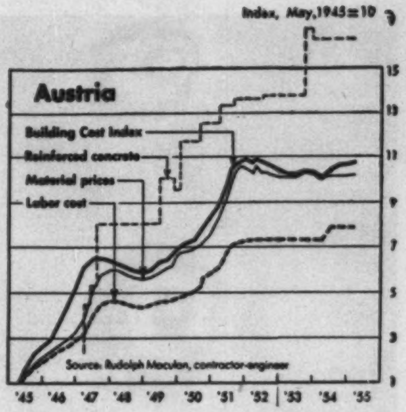
WITH NEW RING-TITE COUPLING



By H. J Venning, FRICS; copyrighted by "The Builder"



Instituto Centrale di Statistica



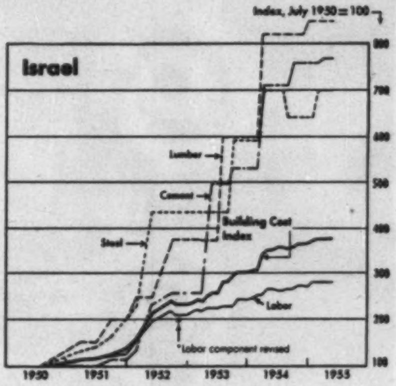
Source: Rudolph Maculan, contractor-engineer

Construction Costs Around the World

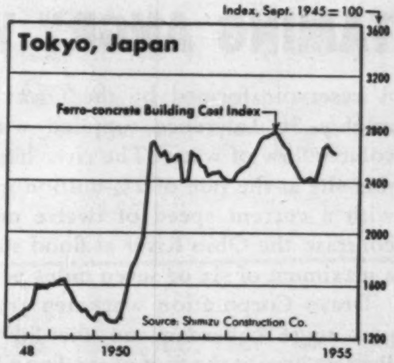
- **Geneva, Switzerland** lumber prices are up 20-25% over a year ago. Materials are in good supply but building workers have always been in short supply. Large numbers of skilled and unskilled Italian workers come in for three to nine months of each year and are paid the same wages and get the same benefits as Swiss workers.
- **Helsinki, Finland** has a comparatively good supply of construction materials but skilled labor is short. Unskilled labor is plentiful. Building costs have been stable since 1953.
- **London, England** reports reinforcing steel in very tight supply. There are also spotty shortages of brick. Cement supplies are far from easy but production in '55 is expected to increase about 500,000 tons. Skilled labor remains difficult to find this year because of high employment. Construction activity is even with '54.
- **Madrid, Spain** has a steel shortage, though supplies of other construction materials are in good shape. Skilled labor is short, but plenty of unskilled is available. Construction volume is higher than last year because of increased government construction.
- **Oslo, Norway,** reports shortages of materials, skilled and unskilled workers because of the high level of construction.
- **Paris, France** has a good supply of materials but prices remain high. The country is beginning to feel a labor shortage, especially of skilled workers.
- **Rome, Italy** reports cement short in some parts of the country, though output has increased fast in recent years (from 7.8 million tons in 1953 to more than 10 million tons in 1955.) Bricks are insufficient to meet demand. Skilled labor is in short supply.

The government is planning a 10-year express highway program to be financed partly by government grants in aid. Under the provisions of a new foreign investments act already passed by one house of the Parliament American contractors could transfer profits and capital out of the country immediately and with no limitations.

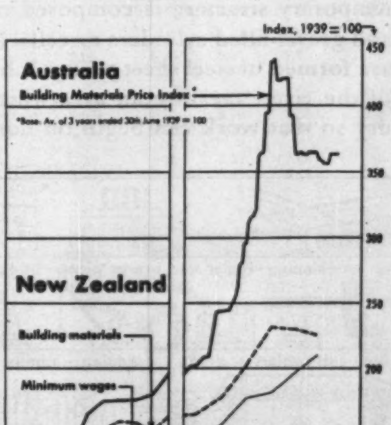
- **Vienna, Austria** sources say the rapid expansion of construction volume has created labor bottlenecks and severe materials shortages. Despite record output, cement and steel must be imported to fill the gap. Austria's biggest cement mill is delivering to its customers no more than they purchased in 1954. Construction volume is up about 10% with private construction in a rapid upswing. On June 25 the government decided to slow down the pace of government construction to relieve the severe shortages of labor and building materials. It extended construction completion dates for 1955 far into 1956 and stopped all new starts until October '55 at the earliest.
- **Cairo, Egypt** has a plentiful supply of construction materials and while June '55 prices were higher than a year ago, they were below early 1955. Both skilled and unskilled labor are so plentiful that Egypt is exporting construction workers to Saudi Arabia and to Kuwait. Heavy exports have created a cement shortage.
- **Johannesburg, So. Africa** has its usual labor shortage and because of this actual wages paid are substantially higher than the minimums shown in the table. Most materials are in adequate supply but steel is short. Domestic mills supply only 60% of the steel needs while the more costly imported steel is hard to get.
- **Melbourne, Australia** reports spotty materials shortages. Melbourne and the State of Victoria are very short of most key materials but there are few shortages in Sydney and New South Wales. Because mills cannot meet demand and import restrictions are more severe, steel shortages are likely. The country is having another wave of inflation. Prices may go up another 5-10% by the end of '55. Skilled labor is still very short and the supply of unskilled is close to inadequate.



Source: Central Bureau of Statistics and Economic Research



Source: Shimizu Construction Co.



Source: Commonwealth Bureau of Census and Statistics
N. Z. Census & Statistics Dept.

TAMING ANGRY WATERS OF THE ST. LAWRENCE RIVER

A reservoir formed by the Great Lakes keeps the mighty St. Lawrence supplied with a steady high volume flow of water. The river has been raging past this site at the rate of 2¼-million gallons per second with a current speed of twelve miles per hour. In contrast, the Ohio River at flood stage only moves at a maximum of six or seven miles per hour.

Dravo Corporation workmen are constructing the first stage cofferdam on the St. Lawrence Power Project here at the foot of the Long Sault Rapids. This temporary structure is composed of a series of sand and gravel-filled cylinders or cells, the shells of which are formed of steel sheet piling. It blocks off a portion of the river, creating an area which can be pumped dry so that work can begin on Long Sault Dam.

A deflector of concrete and steel, sustaining 150 tons of continuous water pressure, diverts the rapids to permit setting the 47-foot diameter cells. In addition to swift water, Dravo also encountered the highest river flow in 80 years . . . an extremely rainy autumn . . . ice and below-zero temperatures . . . one of the heaviest blizzards on record.

This history-making project is typical of many such undertakings of a difficult or hazardous nature. For more than 60 years Dravo has been serving business and industry in many engineering fields, with customer satisfaction considered essential in every transaction. For more information write DRAVO CORPORATION, PITTSBURGH 25, PENNA.

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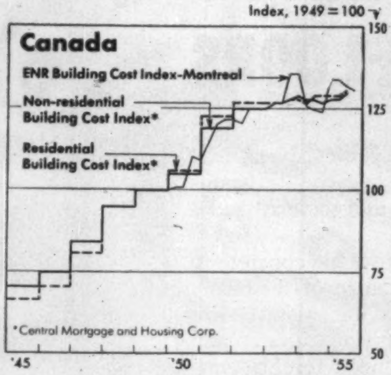


World Cost Trends

- **Istanbul, Turkey** reports materials, most of which are imported from countries behind the Iron Curtain, are in tight supply because foreign exchange is scarce. Cement plants cannot keep up with demand and though 10 mills are under construction even they may not meet domestic needs. Reinforcing steel is scarce and prices are up considerably. Galvanized and black pipe are almost impossible to get. Skilled labor is growing scarce. While unskilled labor is more plentiful than a year ago it costs more.
- **Tel-Aviv, Israel** has a good supply of materials. Unskilled labor is plentiful and the supply of skilled is adequate. Local trade schools are turning out increasing numbers of tradesmen.
- **Bombay, India** prices of reinforcing steel and Indian teak are trending upward. Restrictions on steel supplies will continue until expansion plans are carired out. Labor is plentiful.
- **Colombo, Ceylon** construction costs have increased only slightly since last year. Local shortages have caused cement price fluctuations (the country produces about one-third of its cement needs, the rest is imported.) Skilled labor is plentiful and there is a surplus of unskilled. The government's six-year development plan, which may be launched in October, includes some large jobs on which American contractors may want to bid: irrigation and hydro-electric power plant; cement plant; certain stages of the Laxapana hydro-electric plant; and a large reclamation project including new buildings near Colombo.
- **Manila, Philippines** has a good supply of most construction materials, although copper sheet and some structural shapes are short. Good mechanics and equipment operators are hard to find but there is a surplus of unskilled construction workers. Most construction material prices are at their lowest level since controls went into effect. Much of the decline is due to more local producers.
- **Winnipeg, Canada,** reports construction materials, particularly cement and steel are in very short supply. During June cement scarcity held up construction in areas outside Winnipeg. Skilled and unskilled labor are plentiful. Construction activity is running about 15% ahead of last year in the Province of Manitoba.
- **Ottawa, Canada,** has a good supply of construction materials and labor is reported reasonably plentiful. Construction activity is slightly above '54 and is picking up.

Canada Construction Cost Indexes—1949 = 100

Central Mortgage and Housing Corp.

Non-Residential				Residential			
'39	57.9	'48	95.3	'39	48.1	'48	95.0
'40	60.0	'49	100.0	'40	51.2	'49	100.0
'41	63.9	'50	105.2	'41	56.0	'50	106.1
'42	67.2	'51	118.9	'42	60.0	'51	123.2
'43	69.5	'52	125.4	'43	63.7	'52	126.7
'44	70.5	'53	127.4	'44	66.4	'53	127.4
'45	71.1	'54Jun	127.7*	'45	67.2	'54Jun	128.5*
'46	75.0	'54	127.7	'46	70.4	'54	128.3
'47	84.3	'55Jun	129.5	'47	80.9	'55Jun	131.4

Weighted indexes of wholesale prices and wage rates. Intangibles, productivity, etc., not included. * Revised

Canadian Wage and Cost of Living Changes—1945–'55

Unweighted average wage increases for 8 principal construction occupations (including vacation pay allowances)

	Per cent increase in wages				in cost of living			
City	'45-'55*	'52-'53	'53-'54	'54-'55	'45-'55	'52-'53	'53-'54	'54-'55
Halifax	86.7	3.0	1.8	7.0	47.7	−2.7	0.1	0.7
St. John	84.0	4.3	0.3	3.6	54.5	−2.1	0.3	0.9
Montreal	99.6	1.8	5.0	1.6	55.9	−0.6	−0.1	−0.8
Toronto	104.9	2.8	4.1	3.1	56.9	−0.6	1.4	−0.4
Winnipeg	98.6	7.3	0.0	7.9	52.9	−1.1	0.3	−0.4
Saskatoon	108.9	6.7	3.6	2.5	54.5	1.1	0.2	0.2
Edmonton	101.4	4.6	4.2	1.4	50.5	0.3	0.1	−0.9
Vancouver	111.1	10.8	2.3	1.7	58.9	−0.4	0.3	−0.2
Average, 8 cities	99.8	5.2	2.9	3.3	54.1	−0.8	0.4	−0.1

* 10/'45 to 7/'55; other % changes July 1 to July 1.

Canadian Building Trades Wage Rates July 1, 1955

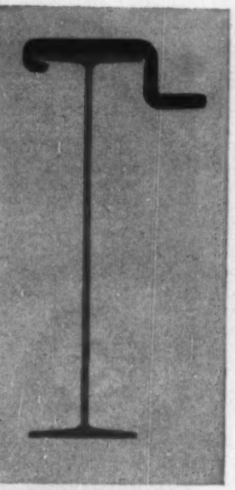
Dominion Department of Labour, and Canadian Construction Assoc.

	Bricklayers				Carpenters				Electricians				Painters			
City	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955
Halifax[a]	$1.00	$1.15	$1.81	$1.94	$0.70	$0.95	$1.56	$1.69	$0.85	$1.06	$1.66	$1.79	$0.60	$0.81	$1.37	$1.45
Saint John	0.90	1.10	1.80	1.85	0.50–0.60	0.81	1.53	1.55	0.50–0.65	0.85	1.57	1.57	0.50–0.55	0.76	1.34	1.40
Quebec	0.75–0.85	1.00	1.70	1.80	0.55–0.60	0.80	1.50	1.60	0.55–0.65	0.80	1.45	1.60	0.50–0.55	0.75	1.45	1.50
Montreal	0.80–0.90	1.06	2.00	2.00[e]	0.70	0.96	1.80	1.80[e]	0.75	1.01	1.90	2.00	0.66	0.86	1.70	1.70[e]
Toronto	1.00	1.23	2.35	2.46	0.90	1.11	2.20	2.30	1.00	1.21	2.33	2.50	0.75	0.97	1.95	1.95[f]
Hamilton	0.90	1.19	2.30	2.35	0.75	1.04	2.10	2.15	0.75	1.05	2.25	2.25[f]	0.65	0.86	1.65	1.65[d]
Windsor	1.15	1.26	2.40	2.45	0.95	1.18	2.17	2.22	1.15	1.26	2.35	2.35[f]	0.60–0.65	0.95	1.80	1.80–1.90
Winnipeg	1.10	1.25	2.10	2.25	0.85	1.05	1.90	2.05	0.85	1.05	1.90	2.05[b]	0.70	0.90	1.65	1.65
Saskatoon	1.00	1.20	2.18	2.23	0.50–0.75	0.96	1.85	1.90	0.70–0.80	0.93	2.00	2.00	0.50–0.70	0.70	1.65	1.70
Edmonton	1.10	1.31	2.30	2.30	0.90	1.03	1.95	2.00	0.85	1.06	2.25	2.25	0.80	0.91	1.65	1.65[d]
Vancouver	1.10	1.29	2.40	2.40	0.75–0.90	1.12	2.22	2.22	0.75–1.00	1.19	2.30	2.42	0.63–0.80	0.97	2.12	2.16

	Plasterers				Plumbers				Sheetmetal Workers				Labourers			
City	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955	1939J	1945J	1954	1955
Halifax[a]	$0.80	$0.95	$1.70	$1.83	$0.85	$1.025	$1.65	$1.78	$0.70	$0.85	$1.47	$1.55	0.30–0.40	$0.52	$1.10	$1.18
Saint John	0.90	1.10	1.80	1.85	0.60–0.70	0.88	1.55	1.60	0.50–0.65	0.81	1.25	1.50	0.30–0.40	0.53	0.75–1.15	0.75–1.15
Quebec	0.75	1.00	1.70	1.80	0.55–0.65	0.80	1.45	1.60	0.55–0.65	0.80	1.50	1.60	0.40	0.60	1.15–1.25	1.20–1.30
Montreal	0.80	1.06	2.00	2.05[g]	0.75	1.01	2.00	2.10[g]	0.65–0.75	0.96	1.80	1.80[e]	0.40	0.61	1.25	1.25[e]
Toronto	0.90	1.21	2.40	2.40[h]	1.00	1.17	2.35	2.35[d]	0.93	1.18	2.25	2.35[f]	0.35–0.50	0.67	1.25	1.30[c]
Hamilton	0.90	1.07	2.25	2.30	0.85	1.07	2.15	2.30	0.75	1.04	2.15	2.30	0.35–0.45	0.65	1.10–1.15	1.15
Windsor	0.90	1.15	2.20	2.10	1.00	1.25	2.35	2.35	0.70–0.85	1.06	2.20	2.25	0.55	0.75	1.62–1.67	1.66–1.71
Winnipeg	1.10	1.25	2.10	2.25	0.95	1.15	2.00	2.15	0.70	0.85	1.75	1.90	0.40–0.45	0.63	1.05–1.25	1.10–1.30
Saskatoon	0.75–1.00	1.06	1.80–2.00	1.80–2.20	1.00	1.06	2.00	2.10	0.75–0.90	0.81–0.85	1.80	1.80	0.30–0.40	0.58	1.28	1.33
Edmonton	1.05	1.31	2.225	2.225	1.05	1.16	2.25	2.25	0.90	1.07	2.05	2.15	0.40–0.50	0.61	1.30	1.35
Vancouver	1.00	1.10	2.30	2.35	1.00	1.19	2.35	2.35	1.00	1.18	2.25	2.30[d]	0.45–0.50	0.71	1.60	1.60[d]

Hourly allowance in lieu of vacation pay are not included. Allowances for above trades are: Halifax, 3¢ for all skills except 4¢ for carpenters & electricians and none for labourers; St. John, 2%; Quebec, 2%; Montreal, 2%; Toronto, 4%; Hamilton, 4% except 2% for painters; Windsor, 4%; Winnipeg, 4% except 2% for electricians; Saskatoon, 4%; Edmonton 4%; Vancouver, 2% except 4% for carpenters, plumbers & sheet metal workers •J Rates as of June 1
•[a] 1939 & 1945 rates include allowance in lieu of vacation pay •[b] $2.10, 9/1/55 •[c] $1.35, 10/1/55 •[d] negotiating •[e] decision pending on arbitration board award
•[f] in conciliation •[g] $2.12, 10/1/55 •[h] $2.46, 8/1/55

NEW YORK ENGINEER DEVELOPS NEW SYSTEM FOR FORMING FLOORS



J&L Junior Beam and the "K" clip

A New York 12-story structure seldom makes news, but the $1,200,000 apartment building shown below is an exception. Its design incorporates a new method of forming floors which substantially reduces the over-all building costs.

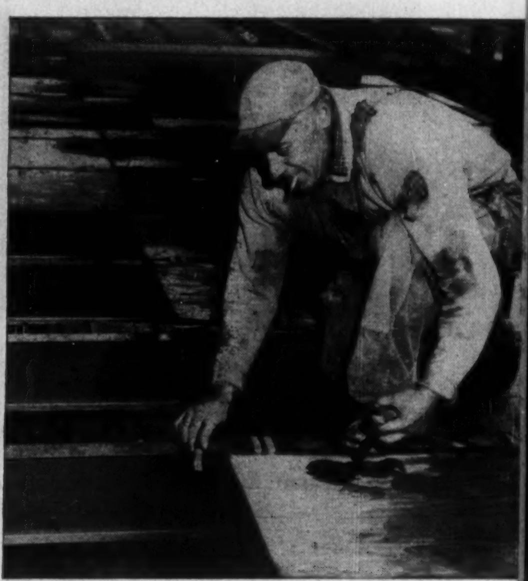
Developed by veteran consulting engineer, E. S. Klausner, the "K" system uses J&L Junior Beam construction to get low-cost, fast steel erection, and a small cast iron clip that speeds the laying and stripping of concrete forms.

Once the Junior Beams are framed into the main structural members, "K" clips are placed along the top flange of the beams. Next, 2x8′ sheets of plywood are placed between the beams so that they rest on the clips and serve as ready-made forms for the concrete.

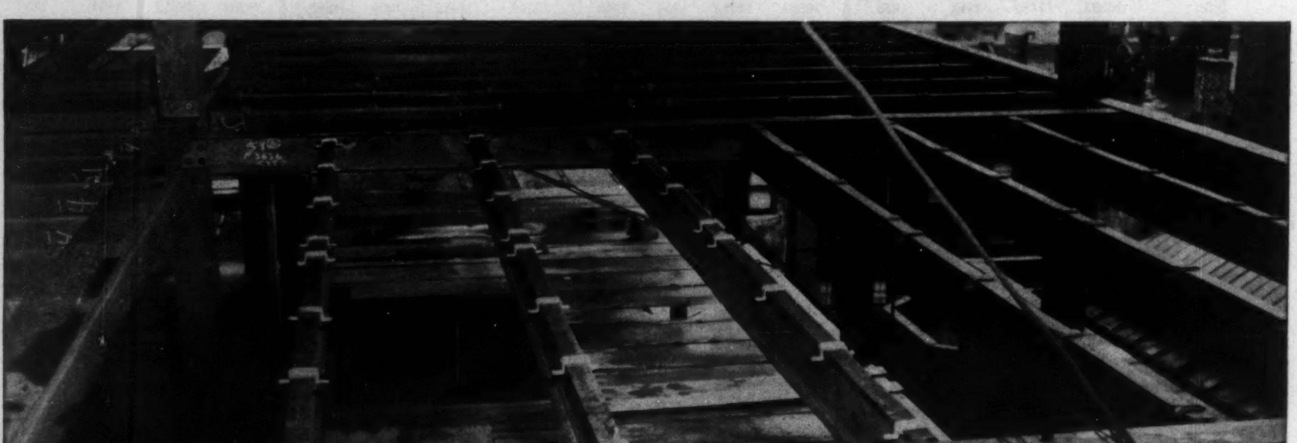
The design of the clip allows the concrete to extend ¼″ below the top flange of the beam, thus bracing the top flange of the Junior Beams along their entire length. This provides greater rigidity and eliminates the need for bridging. Finally, the forms are stripped simply by breaking off the exposed "tail" of the clip and allowing the forms to drop.

New 12-story apartment at 236 E. 35th Street in which the "K" system for forming floors was specified. Architects are Maxon, Sells and Ficke of New York.

Junior Beams are easily handled. As 16-foot length of 8-inch section weighs only 100 pounds, two men can position and bolt in a beam without tying up crane or derrick.

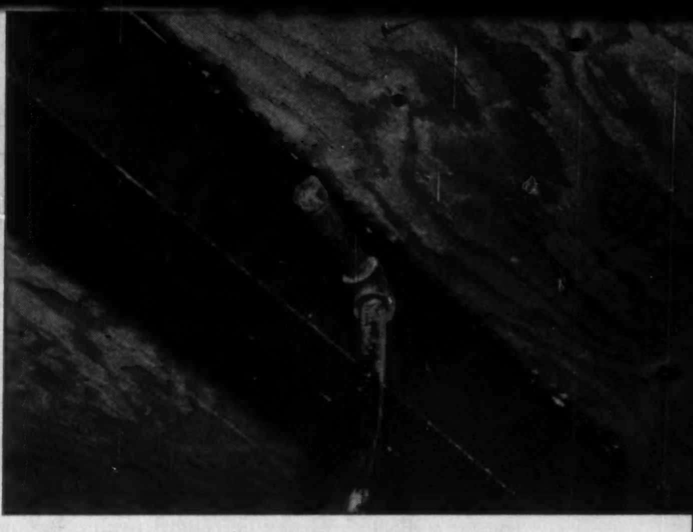


Hooking "K" clip over the flange of a Junior Beam to hold the 2′ x 8′ x ⅝″ plywood sheet used as concrete forms. Clips are placed every 2½ feet along the beam.

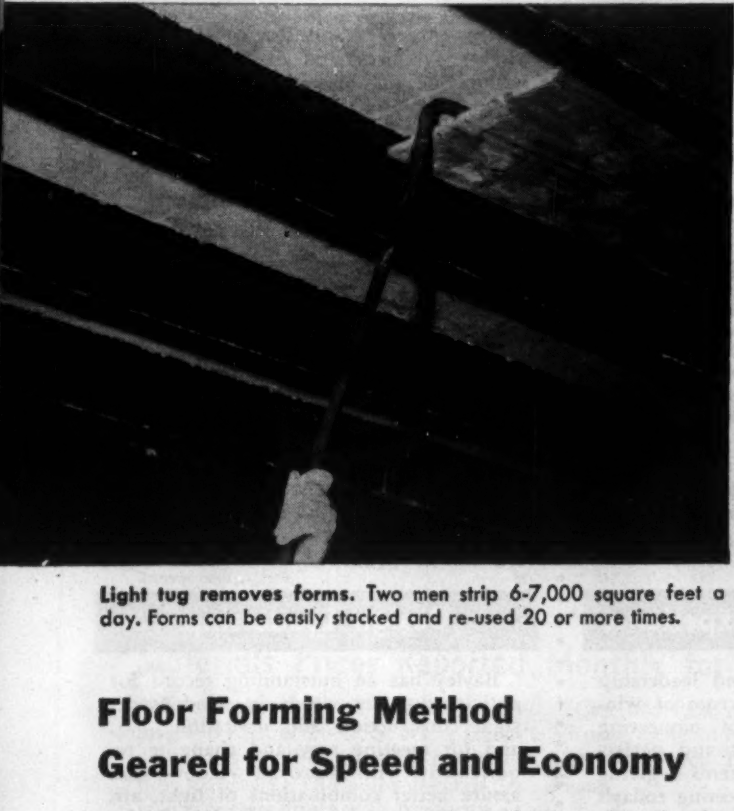


Junior Beam floor joists are framed into the main members of the structure on approximately 26″ centers. "K" clips can be seen in position hooked over the upper flange of the beams.

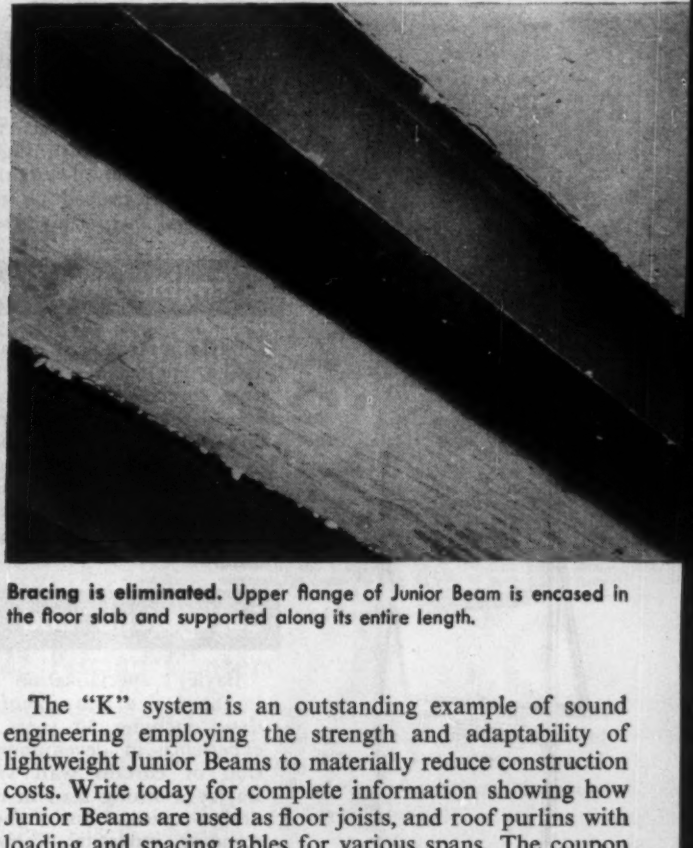
Ease of laying forms is demonstrated by workman. One carpenter and three laborers were able to place forms at the rate of 6-7,000 square feet a day.



Stripping forms. Light blow fractures exposed "tail" of cast iron clips, allowing forms to drop. The "K" clip will withstand a dead load of 1,000 pounds but fractures readily under impact.



Light tug removes forms. Two men strip 6-7,000 square feet a day. Forms can be easily stacked and re-used 20 or more times.



Bracing is eliminated. Upper flange of Junior Beam is encased in the floor slab and supported along its entire length.

Floor Forming Method Geared for Speed and Economy

The Junior Beams were economically fabricated by simply welding a pre-punched end plate to the web of the beam.

On the job, Junior Beams helped speed erection. Whitey Sapilla, Superintendent of the erection crew reported, "these J&L Junior Beams handle easily . . . sorting the steel is no problem. We raise the beams in bundles and two men can distribute and position them without tying up a crane or derrick."

Use of "K" clip makes laying and stripping the concrete forms a simple matter. One carpenter and three laborers were required, yet forms were going in at the rate of 6-7,000 square feet a day. Two men could strip 6-7,000 square feet in a day . . . and forms were re-used more than 20 times.

J&L
STEEL

The "K" system is an outstanding example of sound engineering employing the strength and adaptability of lightweight Junior Beams to materially reduce construction costs. Write today for complete information showing how Junior Beams are used as floor joists, and roof purlins with loading and spacing tables for various spans. The coupon is for your convenience.

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Policy of Responsibility

Bayley recognizes that the architect and builder *as well as the supplier* stake their reputations on the quality and performance of every product specified or used. Through 76 years of progressive experience, Bayley has won full customer confidence through consistently superior window *design, construction,* and *service,* backed by the security of time-tested financial soundness.

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Bayley's large staff of highly qualified design engineers — many of them lifetime specialists — offer assistance that extends beyond the construction of windows alone. They have the *pre-engineering* know-how that integrates window design with building design, for maximum advantages in achieving the utmost in better light, air, vision, beauty and durability.

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Bayley's specialization and leadership in the design and manufacture of windows includes 30 years of pioneering experience in development and perfection of curtain wall systems — giving Bayley a strong lead in meeting today's design trends. A list of the country's outstanding industrial, commercial, public and multiple-residence buildings featuring Bayley Windows is also a list of fully satisfied Bayley customers.

Nationwide Organization

The skill and experience of Bayley's design engineers and service experts is always at "beck and call", through a nationwide organization of well-staffed company offices, supported by trained, franchised agents. The scope of service extends from consultation at the building's inception to actual window performance at the time of occupancy.

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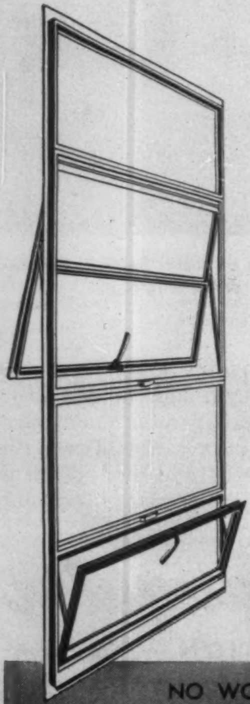
You can be sure that every Bayley Window is *Bayley-made;* produced in Bayley plants by Bayley's own careful craftsmen and production technicians, whose long-accumulated skills in the art of making top-quality windows are supplemented by the finest and most modern manufacturing facilities available.

Design Leadership

Bayley has an outstanding record for *anticipating* new needs in window design, construction and operation . . . and for meeting new and changing requirements with improved windows that assure better combinations of light, air, vision, beauty and strength. And Bayley has tempered this pioneering of new trends by insistence on persevering in quality construction. Many Bayley "firsts" in window features have become standard for the industry.



NO WONDER IT'S SO OFTEN SAID THAT—

QUALITY APPROVED
P-A2

where the *other* services also count — it's always

BAYLEY WINDOWS

THE WILLIAM BAYLEY COMPANY Springfield, Ohio

District Sales Offices:
Springfield
Chicago 2
New York 17
Washington 16

Shortages Add to Materials Price Increases

The rise in materials prices this year has been accompanied by shortages that delayed deliveries, reinstated allocations and otherwise disrupted work schedules. These began to show up in May and June and continued to be troublesome into September.

The uptrend picked up momentum when the steel price rise more than doubled last year's. Fir prices continued up but not at the rate that followed last year's long strike but pine's increase was almost six times last year's rate. This price movement for eight major construction materials is compared in the accompanying table.

The non-ferrous metals saw a sensational rise in copper from 30¢ per lb in April to 43¢ in September and up to 52¢ from "irregular" suppliers. But the world price went up to 47¢ in London. Aluminum sheets increased 6 percent for flat, 13 percent for corrugated. Stainless steel flat sheets increased 6-7 percent.

Structural steel bookings were up 33 percent in the first half but shipments lagged 13 percent. In Cleveland delivery required 120 days, in San Francisco until October or November for June orders. In Kansas City 30-day delivery on reinforcing bars early in the year stretched to 60 days in the spring, 90 days during the summer. September steel deliveries in Baltimore are coming in 60-90 days behind schedule and no deliveries on large orders of structurals are being promised until the first quarter of '56.

Cement shortages are world wide. By June they were critical in Dallas, in Indiana, Southern California, Ohio. By July, Boston and Minneapolis had major troubles, in August Chicago and Iowa joined the list and in September St. Louis. Cleveland shortages eased but Cincinnati's troubles increased with diversion of cement from that area to flood disaster areas. Ohio brought in Canadian cement but Canada has shortages too. Several ready-mix plants in St. Louis had to close down in September. A 40-mile section of the Kentucky Turnpike faces delay and many jobs in Chicago are delayed for lack of cement. Some private work in Baltimore is using bagged imported cement while ready-mix plants are going as far as Tennessee for supplies. Fortunately cement companies have launched expansion programs that will help prevent future shortages.

Plywood shortages in June and delivery difficulties on lumber resulted from a serious boxcar shortage when mills could get only 50 percent of the cars needed. No relief was expected until fall.

The ENR cost indexes' materials component is up 7.5% since last September due to rises in prices of cement, structural steel and lumber. Individually this is how these went up: cement 3.2%, steel 8.2%, fir 7.4% and pine 8.8%.

Materials that are not included in the cost indexes showed these price increases for the year: sand 5.4%, common brick 4%, ready-mixed concrete 3.3%, structural clay tile 0.4%, all based on 20-cities average.

Building Materials Prices

ENR average yearly prices at New York, except steel

Year	Brick common per M	Cement per bbl	Lime per bbl	Pine per M ft bm	Steel shapes per cwt h
1874....	$7.41	$1.48R	$1.50a	$26.00d	....
1898....	6.65	2.25R	.95a	21.75d	....
1907....	6.16	1.55C	.95a	30.50d	1.75
1913....	6.75	1.18C	.915a	25.04e	1.50
1929....	11.71	2.23C	2.25b	64.50f	1.92
1932....	9.75	1.62C	2.25b	39.91f	1.56
1938....	13.10	2.12C	2.80b	59.33f	2.18
1939....	13.46	2.20C	2.80b	64.35f	2.10
1942....	14.17	2.20C	2.80b	85.61f	2.10
1947....	26.38	3.46C	24.34c	115.83g	2.61
1948....	30.33	4.05C	26.32c	114.38g	2.98
1949....	33.00	3.32p	26.80c	98.13g	3.25
1950....	33.50	3.52p	27.10c	131.88g	3.42
1951....	37.92	3.78p	31.00c	154.79g	3.65
1952....	36.45	3.84p	32.00c	155.00g	3.73
1953....	35.33	3.97p	32.00c	156.67g	3.98
1954....	38.92	4.01p	32.00c	157.21g	4.16

BRICK: wholesale, fob; **CEMENT:** net, delivered R Rosendale, rest Portland C in cloth bags delivered (1949–$4.23) price of bags included *p in paper bags, fob city in carload lots **LIME:** *a common lump, wholesale, fob, 180 lb., net *b 280 lb. *c common hydrated, delivered, per ton (40 bags of 50 lb. ea) no longer quoted per bbl. **LUMBER:** No. 1 common, rough *d 1-in. yellow pine, wholesale at dock *e 3-in. LLYP *f 3x12 LLYP from Lumber Trade Jl. *g 3x12 SLYP (LLYP out of market) **STEEL:** h fob Pittsburgh.

Material Prices & Movements 20 cities' average

	Unit	1954	1955	% Change from previous year 1954	% Change from previous year 1955
Cement bulk....................................	bbl	$3.457	$3.567	+3.9	+3.2
Structural steel, (3-mill aver.)...................	cwt	4.250	4.600	+3.7	+8.2
Sand..	ton	2.251	2.372	+3.1	+5.4
Lumber, 2x4 Fir..................................	Mbm	113.000	121.388	+11.1	+7.4
Lumber, 2x4 Pine.................................	Mbm	92.300	100.466	+1.5	+8.8
Common brick.....................................	M	33.237	34.580	+1.4	+4.0
Ready-mixed concrete.............................	cy	12.199	12.601	+2.2	+3.3
Structural clay tile, 3x12x12....................	M	161.938	162.571	+1.5	+0.4

Materials Prices Reported Monthly for 22 Pricing Centers

Engineering News-Record carries prices in each of 20 U. S. and 2 Canadian cities on the following construction materials. These are checked by field reporters direct with producers or distributors.

These prices are quoted and requoted on the same quantity, the same assumed destination, the same units in order that they will truly reflect basic price movements. These materials are:

Portland Cement, Sand and Gravel, Crushed Stone, Crushed Slag, Concrete Block, Concrete.

Paving Brick and Block, Paving Asphalt, Asphalt Binders—Fluxes, Cutback Asphalt, Road Oil, Asphalt Emulsion.

Structural Shapes, Reinforcing Bars, Expanded Metal Lath, Welded Fabric Reinforcing.

Cast Iron Pipe, Asbestos Cement Pipe, Vitrified Sewer Pipe, Clay Drain Tile, Concrete Sewer Pipe, Wrought Steel Pipe.

Short Leaf Yellow Pine and Douglas Fir, Long Leaf Yellow Pine, Plywood, Piles, Railway Ties.

Window Glass, Explosives, Water, Sewage Treatment and Chemicals for Road Work.

Structural Clay Tile, Partition-scored, Structural Clay Tile, Load Bearing-scored, Brick, Lime.

Red Lead, White Lead, Ready-Mixed Paint, Roofing Supplies.

Plaster, Vermiculite, Aluminum Sheet, Stainless Steel Sheet—Type 302, Copper Water Tubing—Type L.

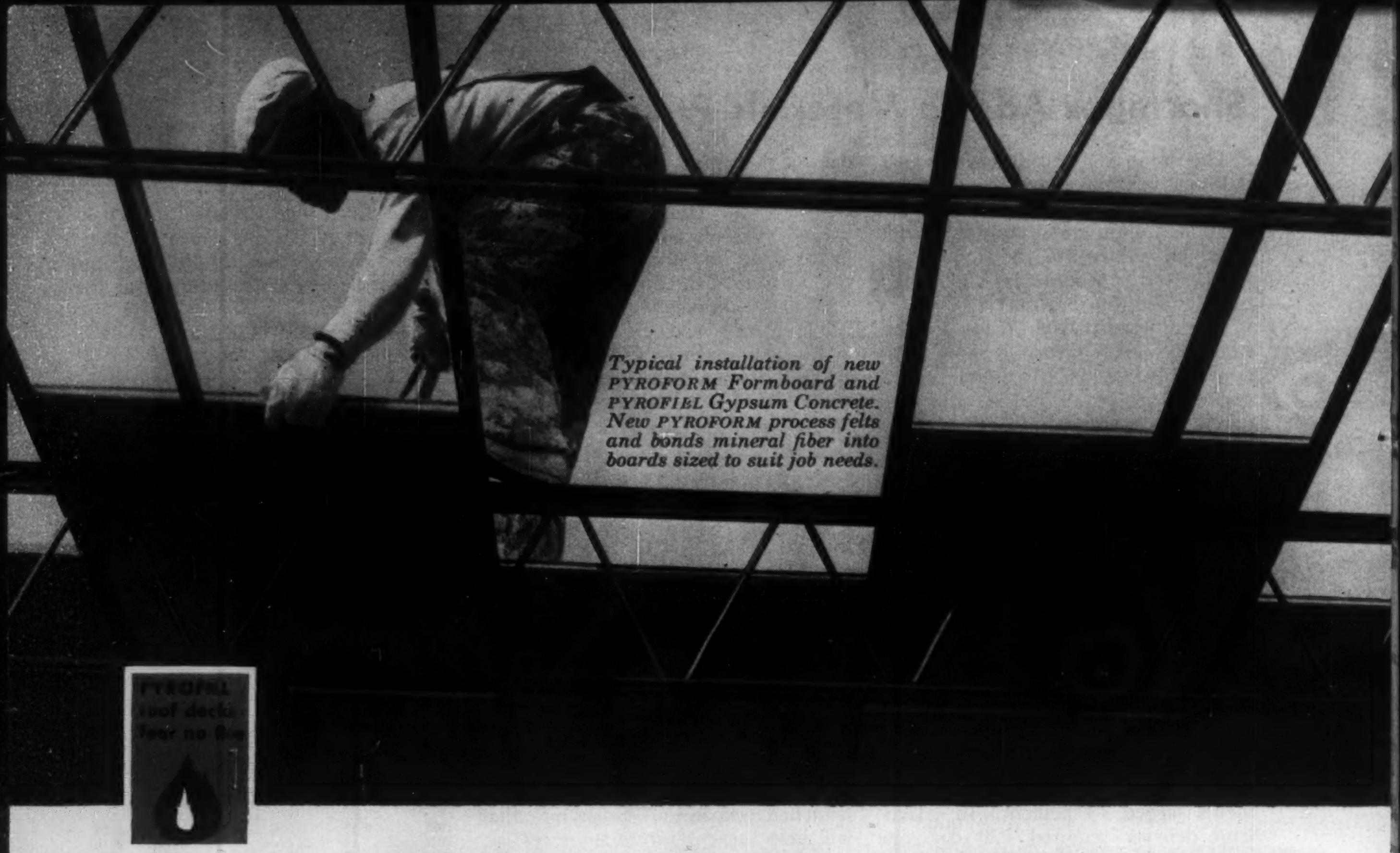
Gypsum Plaster Board, Gypsum Board Lath, Gypsum Sheathing, Fiber Board Sheathing, Fiber Board Insulation, Mineral Wool Insulation, Insulation, Aluminum Foil 60 Kraft Expansible.

These price pages are in the first issue of ENR each month except when the first Thursday falls on the 1st, 2nd or 3rd of the month. In those months the five price and wage pages are in the second issue. They were pages 68, 69, 70, 72 and 73 in ENR, September 8, 1955.

The October prices will be in the October 6 issue.

Reprints of the September 8 price pages are available free.

Address request to: Manager, Business News Department Engineering News-Record, 330 West 42 St., New York 36, N. Y.



Typical installation of new PYROFORM Formboard and PYROFILL Gypsum Concrete. New PYROFORM process felts and bonds mineral fiber into boards sized to suit job needs.

PYROFILL
roof decks
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NEW roof deck system fights fire... insulates... absorbs sound

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MINERAL FIBRE FORMBOARD

PYROFILL*

GYPSUM CONCRETE

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PYROFORM, new formboard by U.S.G., provides the desirable insulation and acoustical advantages. PYROFILL, long preferred for poured-in place roof decks, gives the economy and durability of a monolithic slab—both are incombustible. Used together they mean savings in construction costs—economy in plant heating and cooling. Yearly fire insurance premiums are often reduced as much as 30%.

PYROFORM-PYROFILL roof decks have a U factor of .16. An excellent sound absorber—PYROFORM formboard has an NRC of .75. PYROFORM-PYROFILL weighs only 10 to 12 lbs. per sq. ft., saving on structural steel and footings. PYROFILL sets in less than an hour and is then capable of carrying normal construction loads. A single crew can pour from 20,000 to 30,000 sq. ft. per day, ready for roof covering.

FOR FREE SAMPLE OF PYROFORM and full information, write Dept. ENR-2, 300 W. Adams St., Chicago 6, Illinois.

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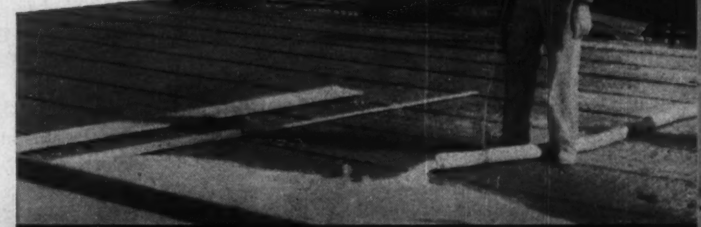
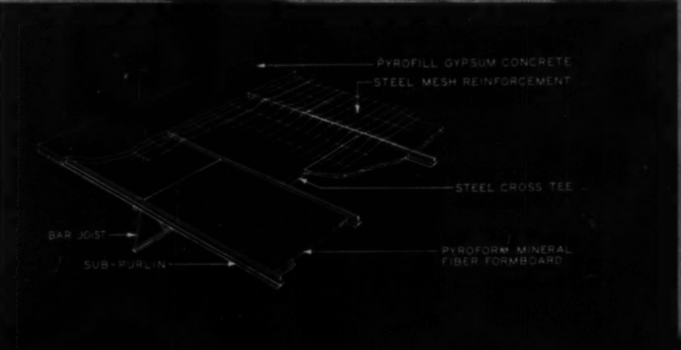
THE GREATEST NAME IN BUILDING



Pouring PYROFILL slurry. Outstanding advantages: incombustible, low in cost, adaptable, light-weight, strong, durable, quickly installed.



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STEEL MESH REINFORCEMENT
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Wholesale Prices

Building materials are up 27.4 percent from their 1947-49 averages. This increase is about 8% greater than the rise in other industrial products in the same period. So says the Wholesale (Primary) Price Index of the Bureau of Labor Statistics.

In August 1955 the BLS Building Materials Price Index was 125.7 compared with 117.4 for other industrial products, both based on 1947-49 as 100. In 1952, with Korea fighting still on, the Building Materials Price Index was 118 only 4.4 percent higher than the price index for other industrial prices.

The biggest price rises since 1947-49 are in these products which BLS includes in its Building Materials Index: structural shapes 57.5%, fans and blowers $54.4%, incandescent lamps 47.2%, metal doors 46.4%, structural clay products 42.9%, Douglas fir 34.1%, building paper and board 33.3%, portland cement, 31.8%, plumbing equipment 28.1%, concrete ingredients 25.3%, elevators and escalators 22.6% and gypsum products 22.1%.

Sizeable increases came in: heating equipment 15.5%, southern pine 15.1%, asphalt roofing 14.5% and softwood plywood 10.7%.

Wholesale Price Index, Building Materials

Bureau of Labor Statistics, 1947–49 = 100

Month	1947#	1948#	1949#	1950#	1952	1953	1954	1955
Year	94.0	104.0	102.0	109.5	118.2	119.9	120.2	.....
Jan	88.7	100.7	105.4	102.1	117.8	118.4	119.6	122.1
Feb	89.9	101.2	104.9	103.2	117.9	118.7	119.2	122.5
Mar	91.5	101.8	104.4	104.1	118.0	119.2	119.3	122.8
Apr	92.8	102.0	103.4	104.7	118.2	119.9	119.0	123.4
May	93.0	102.5	102.4	106.3	118.1	120.2	118.6	124.1
June	92.8	103.1	101.5	107.5	117.8	120.5	118.5	124.1
July	93.4	104.5	100.3	109.1	118.0	121.3	120.5	125.7
Aug	94.9	106.7	99.7	112.0	118.6	120.8	120.8	127.4p
Sept	96.2	107.0	99.9	114.4	118.7	120.4	121.3	.....
Oct	97.1	106.6	100.2	115.8	118.6	120.0	121.7	.....
Nov	98.3	106.3	100.6	116.3	118.4	119.5	121.9	.....
Dec	99.2	105.9	101.2	118.3	118.3	119.6	122.0	.....

Official beginning January, 1952 # Unofficial—for official Index for these years see the 1926 = 100 wholesale price index discontinued by BLS 1952 p preliminary

Construction Materials Prices in 20 Cities

Market quotations on construction materials as reported to Engineering News-Record

	CEMENT, Bulk per bbl CL lots, fob city Incl. Dealer Disc		SAND, per ton Truck lots or over fob city		CONCRETE, READY MIXED 1:2:4 over 50 cy per cy delivered		BRICK, CLAY BACKING per M quantity delivered		STRUCTURAL CLAY TILE Partition, Score, 3 x 12 x 12, per M, 2000 pieces or over delivered	
	1954		1954		1954		1954		1954	
ENR 20-Cities	Low	High-Dec.	Low	High-Dec.	Low	High-Dec.	Low	High-Dec.	Low	High-Dec.
Average	3.35	3.46	2.20	2.30	11.98	12.24	32.91	33.29	158.45	162.59
Atlanta	3.56	3.56	1.83	2.50	12.06	12.06	27.38	27.38	195.00	195.00
Baltimore	3.60	3.60	2.00[f]	2.00[f]	11.45	11.45	36.00	36.00	186.00	186.00
Birmingham	2.60[b]	2.75[b]	2.08	2.08	11.00	11.00	23.50	26.50	126.00[p]	126.00[p]
Boston	3.84	3.96	2.50	2.50	12.00[i]	12.50[i]	36.85[p]	36.85[p]	196.00[q]	196.00[q]
Chicago	3.17	3.32	3.65[fg]	3.65[fg]	11.94	12.00	26.00	26.00	135.00	135.00
Cincinnati	3.55	3.55	2.24[fh]	2.24[fh]	10.95	10.95	45.00[p]	45.00[p]	185.00[p]	185.00[p]
Cleveland	3.19[b]	3.19[b]	1.65	1.65	14.95[k]	15.50[k]	34.50	34.50	170.00	170.00
Dallas	2.85	2.85	1.84	1.84	9.40	9.40	19.75	19.75	......	......
Denver	3.74	3.94	1.20	1.20	10.50	10.50	34.00	34.00	......	......
Detroit	3.02[c]	3.17[c]	4.00[fg]	4.00[fg]	12.00	12.70	37.25[p]	37.75[p]	130.00	130.00
Kansas City	3.22	3.47	1.50[f]	1.85[f]	12.00[l]	12.75[l]	28.50	28.50	127.50	127.50
Los Angeles	4.00[a]	4.26[a]	2.11	2.21	11.78[m]	11.88[m]	27.50[q]	27.50[q]	......	......
Minneapolis	3.64	3.79	1.50[f]	1.60[f]	12.75	13.25	35.00	35.00	175.00[p]	175.00[p]
New Orleans	3.02	3.17	1.82	2.00	12.90	12.90	31.00[p]	31.00[p]	170.00	170.00
New York	3.70	3.70	1.80[gi]	1.90[gi]	13.55[n]	14.05[n]	37.00	41.00	140.95[r]	147.30[r]
Philadelphia	3.45	3.45	2.35[f]	2.35[f]	12.50	12.50	32.00	32.00	145.30	156.30
Pittsburgh	3.19	3.34	2.20[f]	2.20[f]	13.00	13.00	36.00	36.00	112.00	138.00
St. Louis	3.22[d]	3.38[d]	2.60[d]	2.60[d]	11.40	11.90	40.00	40.00	142.00[p]	150.00[p]
San Francisco	3.16	3.27	2.02	2.17	11.25[o]	12.15[o]	37.00	37.00	156.85[tu]	156.85[tu]
Seattle	3.35[a]	3.55[a]	3.00[dfg]	3.50[dfg]	11.40	12.30	34.00	34.00	223.00[p]	223.00[p]
Montreal	2.86[a]	2.96[ae]	2.25[h]	2.25[h]	10.55	10.55	38.50	39.50	165.00	165.00

[a] subj to 10¢ disc [b] truckload lots, destination price [c] mill price plus freight [d] less 2% for cash [e] Dec. $2.86 [f] delivered [g] per cy [h] 5 tons or more [i] barge lots asd [j] 50¢ cash disc [k] 7-9 mi zone [l] 25 cy plus [m] 1:2¼:4 mix [n] 5 cy or more deliv Man [o] 10–100 cy [p] truck loads [q] fob yard [r] fob trucks, job site [s] Dec. $147.00 [t] smooth [u] fob Stockton

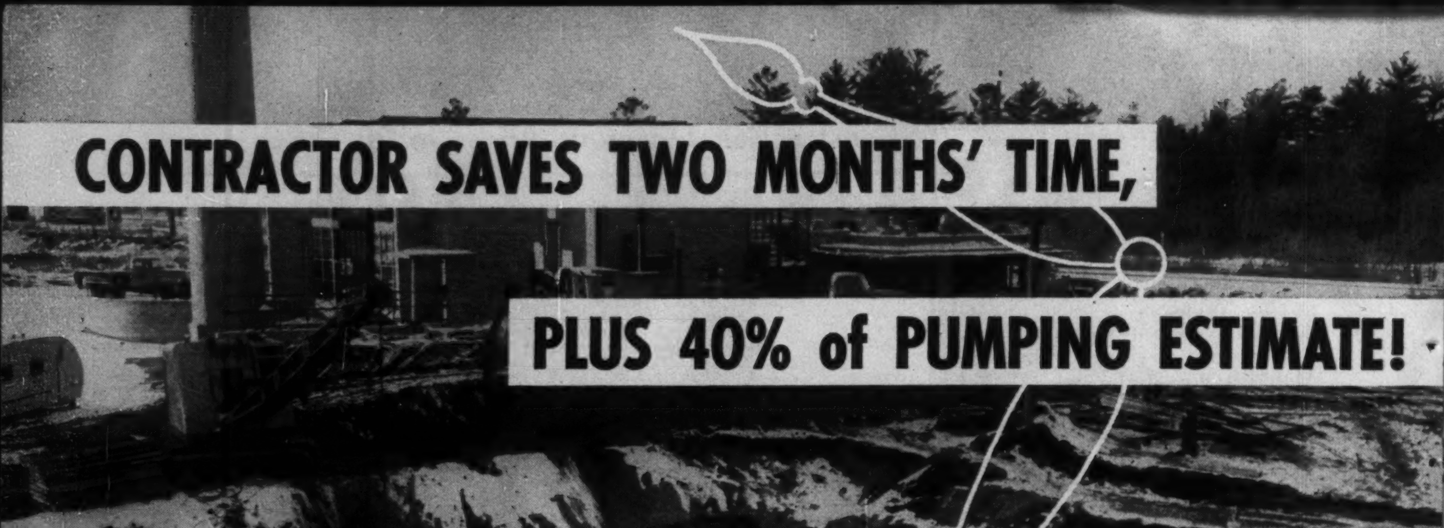
LUMBER, No. 2 Common or better, 2 X 4 s4s

	Short Leaf Yellow Pine					Douglas Fir				
	1954			1955		1954			195	
ENR 20-Cities	Jan. High	Low	Dec.	Jan.	Aug.	Jan. High	Low	Dec.	Jan.	Aug.
Average	89.12[j]	94.33	94.33	95.20	100.07	99.82	115.51	113.50	114.22	120.81
Atlanta[a]	71.50[k]	73.50	73.50	73.50	73.50	......	......	......	......	......
Baltimore[b]	70.00[l]	87.00	87.00	85.00	92.00	89.50[t]	125.00	125.00	120.00	131.00
Birmingham[a]	70.50	73.50	73.50	80.50	80.50	70.50	108.50	108.50	108.50	108.50
Boston[ab]	94.00[i]	98.00[i]	96.00[i]	96.00[i]	107.00[i]	94.50[u]	113.00	112.00	115.00	124.00
Chicago[d]	86.50	93.50	90.00	90.00	95.00	97.00	114.00	109.00	111.00	118.00
Cincinnati[b]	77.00[m]	81.25	80.00	80.00	83.00	105.50[v]	109.25	105.50	105.50	112.50
Cleveland[d]	85.00[n]	99.00	99.00	96.00	103.00	92.00	114.50	104.00	107.00	118.00
Dallas[a]	60.00[o]	76.00	65.00	65.00	68.50	......	......	......	......	......
Denver[b]	......	......	......	......	......	101.00	122.00	117.00	117.00	121.50
Detroit[e]	97.00[p]	110.00	105.00	105.00	108.00	93.50	104.50	103.50	106.50	134.00
Kansas City[b]	102.50	110.00	110.00	110.00	120.00	105.00	130.00	125.00	129.00	125.00
Los Angeles[f]	......	......	......	......	......	85.00	112.00	97.00	97.00	107.00
Minneapolis[g]	......	......	......	......	......	135.00	145.00	145.00	140.00	140.00
New Orleans[a]	92.50	92.50	92.50	92.50	92.50	109.50	123.50	115.00	117.00	121.00
New York[h]	111.50[q]	120.00	120.00	122.50	125.00	117.50[w]	125.00	125.00	127.50	127.50
Philadelphia[e]	118.50	118.50	118.50	125.00	127.00	135.00	146.50	146.50	146.50	147.00
Pittsburgh[a]	92.50	97.50	95.00	95.00	106.00	115.00	125.00	125.00	125.00	130.00
St. Louis[g]	94.00[r]	110.00	110.00	112.00	120.00	109.75	125.00	121.00	122.00	139.50
San Francisco[a]	......	......	......	......	......	59.00	86.00	86.00	84.00	90.00
Seattle[a]	......	......	......	......	......	75.00	82.50	72.50	72.50	80.00
Montreal	85.00[ir]	92.00[i]	88.00[i]	88.00[s]	92.00[i]	110.00[x]	165.00	165.00	165.00	155.00

[a] fob mill [b] fob city, CL out of yard [c] asd [d] fob city CL dir mill [e] deliv to contr [f] retail LCL at yard [g] retail LCL deliv [h] deliv truck lots [i] spruce [j] Jan $91.05 [k] Jan $73.50 [l] Jan $78.50 [m] Jan $81.25 [n] Jan $87 [o] Jan $76 [p] Jan $100 [q] Jan $113.50 [r] Jan $99 [s] Jan $92 [t] Jan $94 [u] Jan $95 [v] Jan $106 [w] Jan $119.50 [x] Jan $165

Major Items Included in BLS Building Materials Price Index—1947–49=100

Major items	Weight %	August 15 1947	1948	1949	1952	1953	1954	1955
All building materials	100.0	94.9	106.7	99.7	118.6	120.8	120.8	127.4
Lumber & wood products	38.6							
Douglas fir	8.2	99.2	113.8	92.0	128.3	115.5	124.5	134.1
Southern pine	9.3	95.2	105.9	92.1	117.0	115.0	111.5	115.1
Other softwoods	7.1	91.0	111.7	103.2	129.7	134.8	130.2	138.4
Hardwood	6.3	96.0	108.7	90.8	110.9	115.8	112.1	120.4
Millwork	5.9	87.6	108.1	107.2	127.2	131.7	130.1	128.3
Softwood plywood	1.3	88.3	119.7	90.6	112.9	115.4	114.7	110.7
Hardwood plywood	0.5	96.1	105.8	92.9	101.1	110.9	98.8	102.6
Non-metal minerals	19.2							
Concrete ingredients	6.3	94.0	103.3	105.0	112.9	118.6	122.2	125.3
Portland cement	3.0	92.6	104.8	105.2	116.4	123.8	128.3	131.8
Concrete products	3.1	95.5	102.2	103.9	112.4	116.1	118.1	118.6
Prep. asph. roofing	3.1	94.4	103.6	102.6	106.0	105.8	98.6	114.5
Struct. clay products	2.5	93.9	104.2	105.2	121.3	131.3	132.1	142.9
Gypsum products	1.2	92.5	104.1	102.3	117.7	122.1	122.1	122.1
Other	3.0	not available						
Insulation matl	na	97.4	103.5	99.1	105.1	107.8	110.1	106.7
Metals & Metal products	29.5							
Structural shapes	1.4	89.9	112.4	112.4	134.9	141.9	146.2	157.5
Metal doors, sash trim	3.3	97.2	102.8	102.8	117.7	127.3	131.4	146.4
Heating equipment	9.5	95.0	102.7	102.5	113.7	115.4	114.0	115.5
Plumbing equipment	3.4	94.8	104.9	102.2	118.1	118.7	118.5	128.1
Other	11.9	not available						
Hardware (finished)	na	97.9	105.1	101.9	122.3	133.4	138.5	146.1
Paint & paint materials	6.8	97.0	100.9	96.5	106.9	106.3	108.3	n.a.
Prepared paints	6.5	98.7	100.6	98.0	110.6	110.7	112.8	114.8
Paint materials	0.3	93.3	101.7	93.1	98.1	96.0	97.8	97.6
Machinery & motive prod	2.9							
Elevators, escalators	0.8	95.6	100.0	105.2	114.1	116.2	118.0	122.6
Fans, blowers	0.4	88.7	104.5	113.7	136.7	141.9	143.7	154.4
Incandescent lamps	1.7	95.9	104.6	104.6	117.9	136.9	136.9	147.2
Bldg. paper & board	1.6	91.8	105.5	103.8	115.8	123.0	127.9	133.3
Miscellaneous	1.4	not available						



CONTRACTOR SAVES TWO MONTHS' TIME, PLUS 40% of PUMPING ESTIMATE!

by predraining foundation with MORETRENCH WELLPOINTS

Sewage Treatment Plant, Merrill, Wis.—Contractor: Burger & Vicker, Inc., Wausau

Before ordering pumping equipment for this job, Burger & Vicker, Inc. tested two wellpoints—*in the ground*—Moretrench and another make of wellpoint which they had been using for several years.

The MORETRENCH Wellpoint pumped 25% more water than the other.

That did it! Moretrench got the order. Results were immediate—and perfect. 21′ of water disappeared fast.

Here's what the contractor says: "Our pumping estimate on this job was based on our former experience with wellpoints. Using Moretrench, we finished the job *two* months earlier than anticipated at 40% less cost!"

Exceptional? No! For a time and money saver on any wet job, you can't beat a MORETRENCH WELLPOINT SYSTEM. For full details on how to pump—at a profit—contact our nearest office.

MORETRENCH CORPORATION

90 West St.
New York 6

4900 S. Austin Ave.
Chicago 38, Illinois

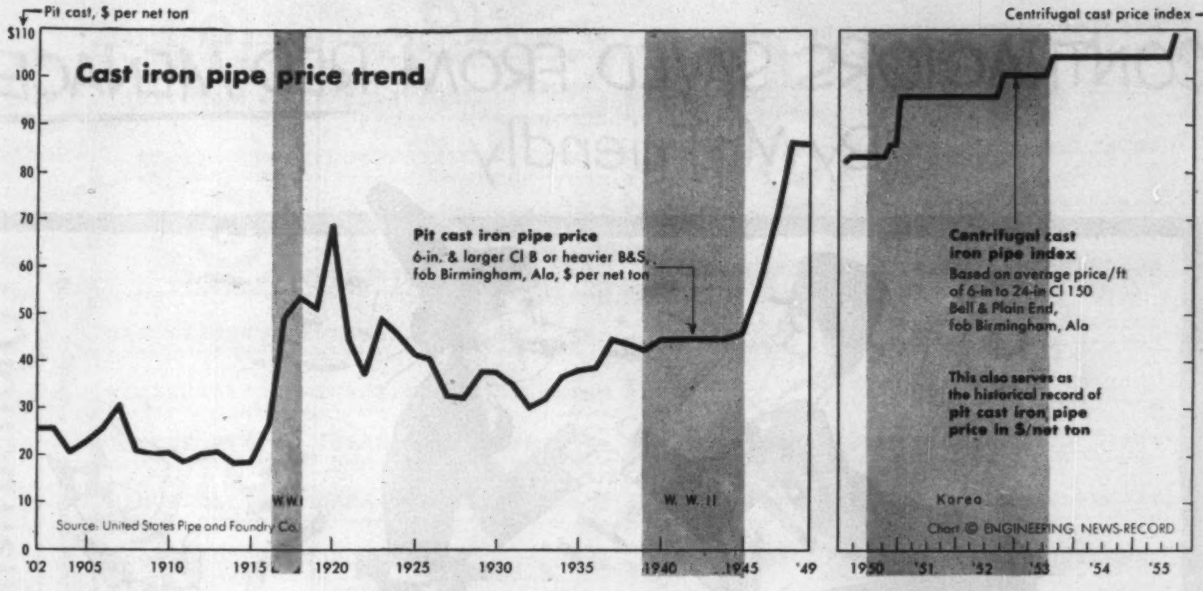
7701 Interbay Blvd.
Tampa 9, Florida

315 W. 25th St.
Houston 8, Texas

Rockaway
New Jersey

Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario



Index Measures Cast Iron Pipe Price Trend

A new index of cast iron pipe prices makes it possible to measure price trends in each of the ENR 20 Cities. The index, computed by the United States Pipe and Foundry Co., was introduced in ENR in August '55 (ENR Aug. 4, 1955, pp. 56 & 83). The table below completes the record of the indexes back to January, 1950, when production of centrifugal or spun cast iron pipe largely replaced output of Class B pit cast. Current values of these figures are published each month in the ENR Materials Price Report.

The index has a double use. While it measures the price trend for centrifugal cast pipe, fob city, it is also read directly as the historical price in $ per ton of Class B pit cast pipe, fob city. This is useful in appraising current values of pit cast pipe in existing installations.

The figures in the table below link at January, 1950 with Class B pit cast prices in 20 cities published monthly in ENR's Materials Price Report. Thus ENR readers have a complete historical price record of pit cast iron pipe prices in 20 cities going back many years.

Annual values of pit cast prices fob Birmingham, Ala. 1902-49 are in the table at the lower right. The chart above plots these prices and brings them up to date monthly using the new index for Birmingham. This chart shows how 24 months of stable prices in Birmingham ended with a 5% rise in August '55. The same is true for Chicago, Cleveland, Dallas, Denver, Detroit, Kansas City, Minneapolis, Philadelphia and Pittsburgh.

The cast iron pipe price index is calculated from the average price per foot, fob city, of centrifugal cast pipe. Sizes from 6-in. to 24-in., Class 150 Federal Specification WW-P-421 Bell & Plain End, in 18-ft. lengths are used. This average is divided by the factor of 2.27 to get the price index for the months January, 1950, through December, 1954. Beginning January, 1955, a change to Federal Specification WW-P-421a and the wider use of ASA Specifications A 21.6 (AWWA C-106), the index is computed by substituting Class 150 Standard Conditions Pipe and dividing by a factor of 2.44.

Pipe Price Trends In 20 Cities, 1950-55

Figures in table are Price Indexes for Centrifugal Cast Iron Pipe,* with carload freight allowed to city, which also serve as the historical record of the $ Per Net Ton Price of Class B Pit Cast Pipe.

	1/'50	2/'50–9/'50	10/'50–11/'50	12/'50–3/'51	4/'51–7/'51	8/'51–4/'52	5/'52–8/'52	9/'52–6/'53	7/'53–12/'53	1/'54–4/'55	5/'55–7/'55	8/'55
Atlanta	88.3	89.2	92.0	101.8	101.9	102.2	102.7	107.6	111.0	109.6	109.6	113.6
Baltimore	94.1	96.1	101.6	111.6	111.6	112.2	112.6	117.2	120.9	120.9	117.9	122.9
Birmingham	82.5	83.4	86.2	96.0	96.0	96.0	96.0	100.9	104.3	104.3	104.3	109.3
Boston	97.9	99.9	105.4	115.2	115.2	116.1	116.8	121.4	125.1	125.1	120.5	125.5
Chicago	97.0	97.9	100.7	110.5	110.8	111.4	112.7	117.6	121.0	121.0	121.0	126.0
Cincinnati	92.8	93.7	96.5	106.3	106.5	106.9	107.8	112.7	116.1	114.5	114.5	119.5
Cleveland	97.7	98.6	101.4	111.2	111.5	112.1	113.5	118.4	121.8	121.8	121.8	126.8
Dallas	96.7	97.6	100.4	110.2	110.5	111.1	112.4	117.3	120.7	120.7	120.7	125.7
Denver	101.2	102.1	104.9	114.7	115.1	116.1	118.1	123.0	126.4	126.4	126.4	131.4
Detroit	97.7	98.6	101.4	111.2	111.5	112.1	113.5	118.4	121.8	121.8	121.8	126.8
Kansas City	95.9	96.8	99.6	109.4	109.6	110.2	111.4	116.3	119.7	119.7	119.7	124.7
Los Angeles	99.4	100.3	103.1	113.7	114.2	115.2	116.5	121.4	125.4	125.4	126.1	131.1
Minneapolis	101.4	102.3	105.1	114.9	115.2	116.0	117.7	122.6	126.0	126.0	126.0	131.0
New Orleans	91.0	91.9	94.7	104.5	104.6	105.0	105.7	110.6	114.0	112.5	112.5	116.0
New York	93.1	95.1	100.6	110.4	110.4	110.3	110.6	115.2	118.9	118.9	116.5	121.5
Philadelphia	90.5	92.5	98.0	98.0	98.0	107.4	107.6	112.2	115.9	115.9	115.9	120.9
Pittsburgh	98.3	99.2	102.0	111.8	112.2	112.8	114.2	119.1	122.5	122.5	122.5	127.5
St. Louis	92.3	93.2	96.0	105.8	106.0	106.4	107.2	112.1	115.5	114.1	115.5	120.5
San Francisco	99.7	100.6	103.4	113.9	114.2	115.2	116.5	121.4	125.4	125.4	126.1	131.1
Seattle	99.7	100.6	103.4	113.9	114.2	115.2	117.1	122.0	125.4	125.4	126.1	131.1

Prices 1902-49

Pit cast, 6" & larger, C1 B or heavier B&S, fob Birmingham, Ala.

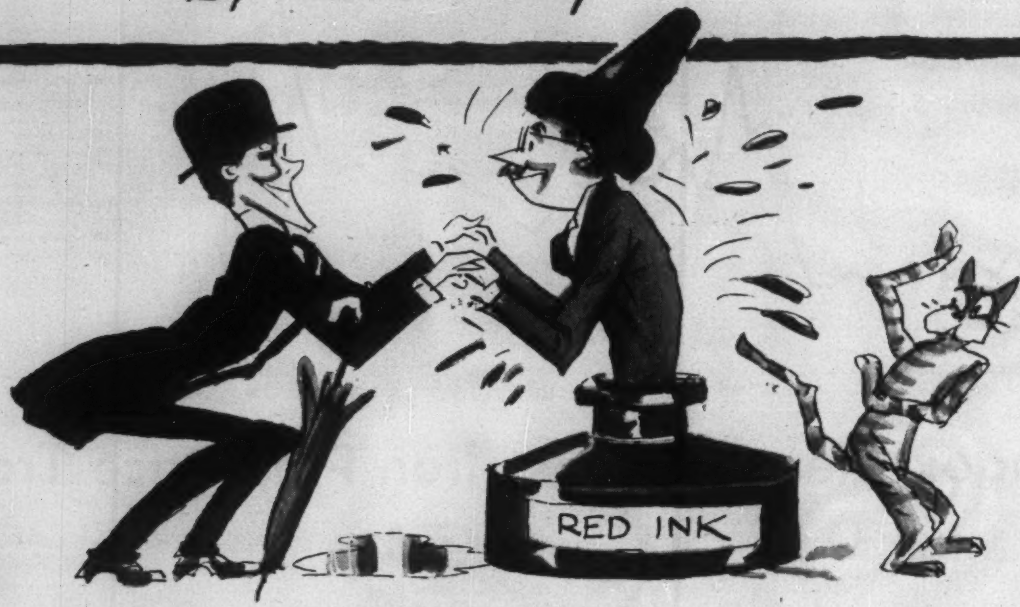
Year	$/ton	Year	$/ton
1902	25.83	1926	40.67
'03	25.85	'27	32.88
'04	20.13	'28	32.46
1905	22.79	'29	38.00
'06	25.46	1930	38.00
'07	30.75	'31	35.46
'08	21.08	'32	30.50
'09	20.46	'33	32.25
1910	20.92	'34	37.00
'11	18.92	1935	38.58
'12	20.46	'36	39.00
'13	21.00	'37	44.75
'14	18.58	'38	44.00
1915	18.89	'39	42.75
'16	26.16	1940	45.00
'17	49.68	'41	45.00
'18	53.85	'42	45.00
'19	51.17	'43	45.00
1920	68.92	'44	45.00
'21	44.50	1945	46.00
'22	37.33	'46	56.83
'23	49.17	'47	70.96
'24	45.88	'48	86.83
1925	41.67	1949	86.17

* Based on average price per ft of 6-in. to 24-in. sizes Class 150 Federal Specification WW-P-421 Bell & Plain End Centrifugal Pipe in 18-ft. lengths for period January 1950 through December 1954. Beginning January 1955, based on same sizes but for Class 150 Standard Conditions Pipe, Federal Specification WW-P-421a and ASA Specifications A 21.6 (AWWA C-106.)

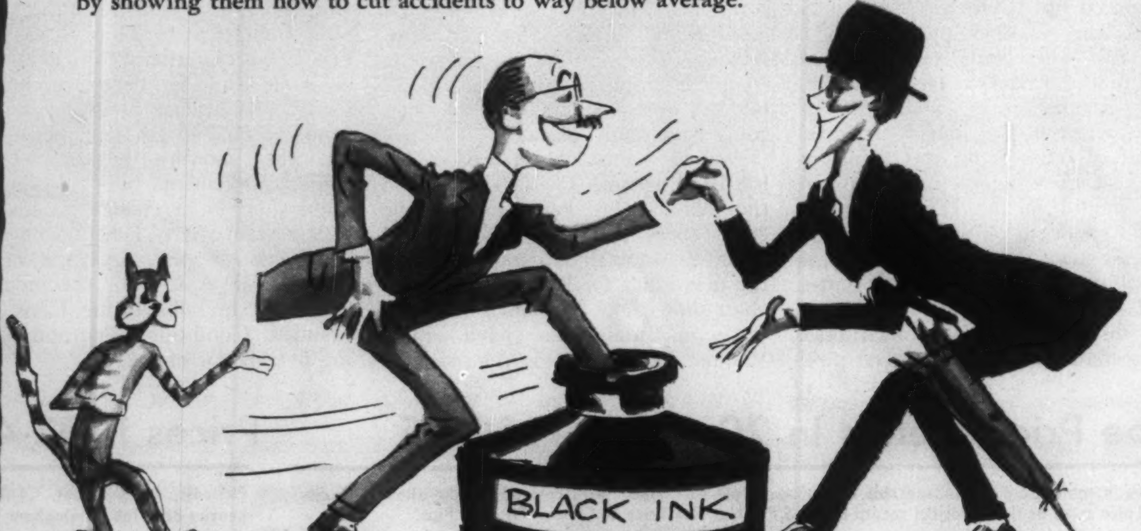
Source: United States Pipe and Foundry Co.

CONTRACTORS SAVED FROM RED MENACE!

By Mr. Friendly



In case after case American Mutual Safety Engineers have helped contractors *stay out of the red* by showing them how to cut accidents to way below average.



This service reduces job costs and insurance premiums and can help put a company firmly *in the black.* In 4 years, for example, The Kansas City Structural Steel Company saved $68,884. Documented case histories of savings like this are reported regularly in this magazine. Watch for them . . . find out how American Mutual helps contractors prevent accidents.

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Base Rates on Compensation Insurance for Construction

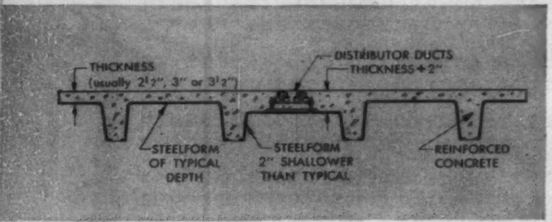
Herbert L. Jamison & Co., Insurance Advisers and Auditors, New York, N. Y.—(Base rates in effect July 1, 1955—subject to increase or decrease according to experience ratings)

Classification of work	Ala.	Alas.	Ariz.	Ark.	Calif.	Colo.	Conn.	Del.	D. C.	Fla.	Ga.	Idaho	Ill.	Ind.	Iowa	Kans.	Ky.	La.	Me.	Md.	Mass.	Mich.	Minn.	Miss.	Mo.
Carpentry—1-2 family residences	$1.14	$3.47	$3.34	$2.55	$2.29	$1.72	$3.12	$1.40	$2.12	$2.78	$1.87	$3.11	$2.17	$1.72	$1 3	$2.03	$1.69	$4.51	$1.64	$2.07	$3.65	$2.30	$2.32	$2.60	$1.68
Carpentry—3 stories or less	1.14	3.95	3.34	2.75	4.26	2.29	4.38	1.40	2.51	2.78	1.87	3.11	2.68	1.96	1.94	2.13	1.76	5.00	1.64	2.33	4.53	2.30	2.32	2.65	2.08
Carpentry interior trim, cabinet work	.56	2.34	3.34	1.45	4.26	1.07	2.42	1.40	1.84	2.52	1.18	1.53	1.43	.92	.86	1.22	.96	2.36	.78	1.55	2.01	1.70	4.05	1.85	2.53
Carpentry general	1.50	7.94	3.34	4.08	4.26	2.83	5.66	1.40	2.68	4.16	3.67	6.80	3.96	2.53	2.45	3.39	2.42	5.22	2.24	3.10	10.44	2.30	4.05	5.56	2.92
Chimney construction, brick, concrete	4.13	12.22	7.89	10.17	12.20	8.13	15.88	A	12.58	13.35	8.41	12.99	8.74	7.04	5.64	10.00	8.17	17.32	5.23	10.56	6.99	9.48	11.03	12.81	12.80
Concrete work—bridges—culverts—C	2.24	A	6.05	4.30	5.28	4.43	7.89	1.30	7.45	4.97	4.16	6.86	4.41	3.10	3.73	3.86	3.18	6.02	3.73	5.03	8.14	3.77	5.70	6.77	4.31
Concrete work—3 stories or less—C	.69	6.75	2.44	1.28	1.02	1.29	3.99	1.30	3.30	2.79	1.00	2.47	1.75	1.06	1.14	1.68	1.17	2.35	1.32	1.81	5.24	1.35	1.87	1.72	1.66
Concrete work—general—C	1.34	7.14	2.94	2.49	2.86	2.79	6.36	1.30	3.80	3.45	2.69	3.86	3.27	1.71	1.77	3.32	1.81	4.99	1.86	3.03	7.77	2.12	3.14	2.84	3.54
Concrete or cement walks, floors, yards	.57	2.76	2.94	1.33	1.17	1.13	3.16	1.30	1.48	2.45	1.69	1.89	1.50	.97	1.13	2.03	1.05	2.57	.98	2.95	2.50	1.12	1.45	1.75	1.59
Electrical wiring	.77	1.83	2.11	1.63	1.56	1.29	1.94	5.00	1.53	1.84	1.46	1.73	1.30	1.06	.96	1.19	.91	1.84	.79	1.72	2.14	1.19	1.12	1.31	1.29
Excavation—earth—D	1.34	3.82	2.94	3.50	2.16	3.22	4.34	1.65	3.24	3.51	2.47	5.34	2.38	1.82	1.91	3.42	2.00	2.86	2.16	3.44	5.67	2.15	3.37	3.48	3.10
Excavation—rock—E	2.17	9.09	6.03	4.78	4.23	5.39	10.17	1.65	5.68	6.44	4.74	6.02	4.99	3.40	2.69	4.74	3.83	8.43	2.63	5.09	10.35	4.09	5.35	6 17	5.99
Glazing	1.57	4.33	3.01	3.67	3.22	2.98	6.00	A	4.26	3.87	3.41	4.55	3.25	2.23	2.28	3.48	2.75	5.00	2.09	3.88	5.55	3.03	4.31	4.64	3.38
Insulating	.63	3.50	A	1.53	2.45	1.41	2.44	1.40	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	3.07	1.31	1.50	3.69	1.11	2.95	2.31	1.56
Lathing	.74	3.50	2.09	1.92	1.40	1.41	3.12	.65	1.98	1.91	1.61	2.09	1.53	1.23	1.11	1.60	1.27	3.07	1.03	1.88	2.84	1.16	1.72	2.43	1.80
Masonry	.69	5.95	2.44	1.28	1.92	1.29	3.61	.80	1.87	2.10	1.17	2.47	1.77	1.28	1.14	1.68	1.17	2.35	1.32	1.91	5.24	1.45	1.57	1.72	2.05
Painting & decorating	1.08	4.77	2.43	1.81	2.80	1.89	4.95	1.45	3.05	3.59	2.05	3.54	2.07	2.40	1.38	1.73	1.79	3.50	1.60	2.88	A	1.84	1.65	2.74	2.77
Pile driving—building operations	3.70	9.10	8.40	9.84	9.99	7.85	7.03	4.55	8.63	8.79	7.62	11.66	7.21	4.28	4.21	9.16	6.20	15.79	2.59	7.99	9.74	5.07	7.94	10 87	8.06
Plastering	.63	3.50	2.53	1.53	1.40	1.41	2.44	.65	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	1.93	1.31	1.50	3.26	1.11	1.75	2.31	1.41
Plumbing	.80	1.82	1.89	1.62	1.87	1.41	2.12	.70	2.33	1.79	1.47	1.84	1.55	1.17	1.18	1.60	.98	2 32	.81	1.72	2.01	1.34	1.70	1.69	1.91
Roofing	2.34	8.95	5.29	6.47	6.35	4.98	7.51	1.20	5.41	4.85	5.02	8.73	6.31	5.64	5.55	5.92	3.57	5.33	3.36	7.45	18.48	4.36	5.59	5.82	4.61
Sheet metal work	1.04	3.04	2.44	2.26	2.13	1.61	3.19	1.20	2.21	2.69	2.35	2.61	1.87	1.72	1.41	1.77	1.49	2.96	1.11	2.24	2.56	1.50	1.50	2.94	1.91
Steel erection—door & sash	1.04	4.90	2.00	2.39	3.15	2.02	4.46	5.35	3.38	2.77	2.13	2.92	2 38	1.68	1.53	2.29	1.81	4.43	1.46	2.61	3.84	2.20	2.96	3.25	2.67
Steel erection—interior ornament	1.04	4.90	3.84	2.39	3.15	2.02	4.46	5.35	3.38	2.77	2.13	2.92	2.38	1.68	1.53	2.29	1.81	4.43	1.46	2.61	3.84	2.20	2.96	3.25	2.67
Steel erection—structural	4.35	19.60	12.79	11.51	13.68	12.62	19.00	5.35	20.22	12.75	10.60	17.57	8.84	5.98	9.42	11.11	8.61	11.91	6.52	9.91	21.91	12.76	10.49	10.86	12.45
Steel erection—dwelling—2 stories	2.60	10.77	5.40	5.96	13.68	5.06	10.34	5.35	6.67	7.32	5.49	8.98	6.68	3.40	3.72	6.04	4.67	8.57	3.58	6.27	12.97	4.43	7.53	7.77	7.64
Steel erection—general	3.16	11.05	12.79	8.01	6.45	8.40	11.12	5.35	13.31	10.79	8.95	12.44	7.56	4.17	6.42	6.72	4.15	11.91	4.16	8.56	15.48	4.45	8.49	9.98	4.94
Tile work—interior	.49	1.11	3.41	1.24	.99	.91	1.98	.65	1.88	1.28	.97	1.31	.96	.79	.74	1.05	.81	1.58	.70	1.27	2.01	1.06	1.44	1.58	1.06
Timekeepers and watchmen	1.09	5.95	F	2.25	F	2.05	4.63	F	2.80	3.45	2.33	3.01	2.68	1.78	1.62	2.38	1.79	4.56	1.51	2.72	4.53	2.16	3.06	2.86	3.31
Waterproofing—brush	1.08	4.77	2.43	1.81	2.80	1.89	4.95	.65	3.05	3.59	2.05	3.54	2.07	2.40	1.38	1.73	1.79	3.50	1.60	2.88	2.89	1.84	1.65	2.74	2.77
Waterproofing—trowel—interior	.63	3.50	2.53	1.53	1.40	1.41	2.44	.65	2.19	1.74	1.07	2.56	1.69	1.09	1.19	1.56	1.25	1.93	1.31	1.50	3.26	1.11	1.75	2.31	1.41
Waterproofing—trowel—exterior	.69	5.95	2.44	1.28	1.92	1.29	3.61	.65	1.87	2.10	1.17	2.47	1.77	1.28	1.14	1.68	1.17	2.35	1.32	1.91	5.24	1.45	1.57	1.72	2.05
Waterproofing—pressure gun	1.34	7.14	2.94	2 49	2.86	2.79	6.36	.65	3.80	3.45	2.69	3.86	3.27	1.71	1.77	3.32	1.81	4.99	1.86	3.03	7.77	2.12	3.14	2.84	3.54
Wrecking	5.55	15.99	20.48	14.68	17.76	12.26	20.10	9.50	15.54	12.81	10.91	18.05	10.60	5.78	8.26	9.68	9.49	17.78	8.45	15.32	21.59	11.45	12.66	14.39	15.49

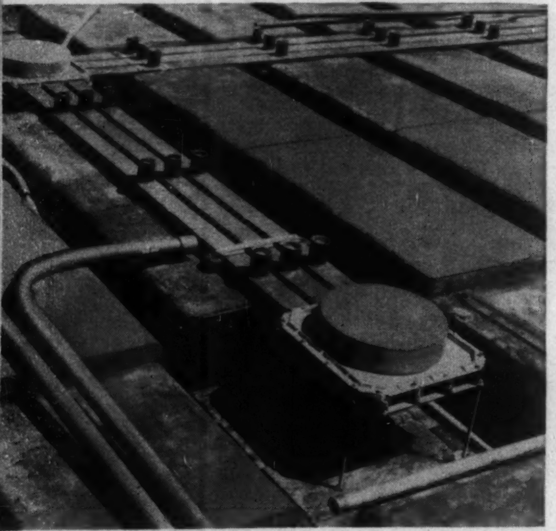
Classification of work	Mont.	Neb.	Nev. G	N. H.	N. J.	N. Mex.	N. Y.	N. Car.	N. Dak. G	Ohio G	Okla.	Oreg.	Pa.	R. I.	S. Car.	S. Dak.	Tenn.	Texas	Utah	Vt.	Va.	Wash.	W. Vir. G	Wisc.	Wyo. G
Carpentry—1-2 family residences	$2.82	$2.21	$3.86	$2.16	$3.00	$3.24	$3.20	$1.83	$2.24	$1.81	$4.10	$4.65	$1.35	$3.78	$2.37	$1.20	$1.90	$2.84	$2.07	$2.24	$1.30	$4.10	$1.60	$2.27	$1.82
Carpentry—3 stories or less	2.82	2.21	3.86	2.46	3.10	3.71	4.80	2.04	2 24	2.07	5.08	4.65	1.35	5.08	2.37	1.20	1.90	2.84	2.07	2.24	1.36	4.10	1.76	3.04	1.82
Carpentry interior trim, cabinet work	1.35	1.07	1.85	1.33	1.40	1.84	A	1.44	3.91	.97	3.30	2.16	1.35	3.75	1.43	.83	1.26	2.10	2.07	.95	.83	1.35	.96	2.27	1.82
Carpentry general	4.25	3.15	5.82	3.58	4.00	5.93	5.00	3.79	3.91	2.67	5.37	5.47	1.35	7.44	5.11	1.68	3.41	4.06	2.07	3.17	2.30	5.42	2.42	3.04	1.82
Chimney construction, brick, concrete	12.68	8.19	17.37	9.70	11.30	13.62	27.50	10.57	10.67	7.42	16.65	A	A	32.29	12.50	4.57	8.95	11.72	10.56	6.51	5.32	A	8.17	10.74	9.29
Concrete work—bridges—culverts—C	6.23	4.01	8.54	6.31	4.90	8.88	8.00	3.67	5.51	3.27	9.02	7.18	1.45	16.85	7.25	3.14	3.76	4.87	5.67	4.11	2.04	6.74	3.18	4.83	4.99
Concrete work—3 stories or less—C	2.21	1.27	3.03	2.56	2.90	1.75	A	1 24	1.81	1.12	3.35	4.26	1.45	5.27	1.14	1.02	1.10	4.06	2.32	2.11	.83	4.00	1.17	1.54	2.04
Concrete work—general—C	3.95	2.81	5.41	4.14	4.90	3.15	6.00	2.68	3.04	1.80	7.41	4.89	1.45	9.51	3.25	1.99	2.28	4.06	2.77	2.35	1.95	4.59	1.81	2.72	2.44
Concrete or cement walks, floors, yards	1.69	1.55	2.32	1.65	2.15	2.49	3.20	1.43	1.40	1.02	2.74	2.34	1.45	4.22	2.00	.99	1.29	2.21	1.62	1.18	.76	2.06	1.05	1.74	1.43
Electrical wiring	1.52	1.28	2.08	1.61	1.90	2.73	3.00	1.36	1.08	1.12	1.95	2.42	2.25	2.63	2.11	.87	1.20	2.03	1.55	1.03	.86	2.27	.91	1.16	1.36
Excavation—earth—D	4.59	2.85	6.29	3.53	3.40	5.95	6.90	2.44	3.26	1.92	6.77	5.45	1.60	9.28	2.62	1.66	2.40	3.00	2.94	2.55	1.66	4.81	2.00	2.71	2.59
Excavation—rock—E	5.64	3.92	7.73	4.63	9.10	7.33	10.00	6.65	5.17	3.58	8.43	A	1.60	14.30	6.11	2.73	4.86	7.69	4.05	3.29	3.66	9.32	3.83	5.44	3.56
Glazing	4.14	3.00	5.67	3.68	4.10	5.06	5.20	3.69	4.17	2.35	5.35	4.92	A	11.16	4.63	2.00	3.46	3.00	1.28	2.57	2.09	4.61	2.75	4.11	1.13
Insulating	2.31	1.41	3.16	2.17	3.40	3.51	5.00	1.18	2.85	1.15	4.60	4.18	1.35	5.54	1.92	1.28	1.24	2.58	2.92	1.51	.78	3.61	1.25	2.85	2.57
Lathing	1.92	1.44	2.63	1.77	1.95	2.47	2.90	1.77	1.66	1.30	2.40	4.18	.70	5.17	2.16	1.04	1.69	1.79	1.94	1.24	1.07	3.61	1.27	1.56	1.71
Masonry	2.21	1.27	3.03	2.56	3.30	2.24	4.60	1.24	1.52	1.35	2.39	4.26	.95	5.27	1.14	1.02	1.10	4.06	1.79	2.11	.79	4.00	1.17	1.67	1.58
Painting & decorating	3.29	1.83	4.51	4.73	4.70	4.13	5.30	1.53	1.60	2.53	3.27	4.88	1.95	5.00	2.83	1.70	1.81	2.14	2.27	1.79	1.39	4.58	1.79	2.38	2.00
Pile driving—building operations	10.79	6.78	14.78	4.83	6.40	13.29	8.10	8.26	7.68	4.51	16.17	11.60	2.65	11.68	8.49	5.41	9.05	14.31	6.21	3.35	4.44	10.38	6.20	9.33	5.46
Plastering	2.31	1.41	3.16	2.17	1.95	3.51	4.40	1.18	1.69	1.15	2.56	4.18	.70	5.54	1.92	1.28	1.24	1.88	2.92	1.51	.78	3.61	1.25	1.52	2.57
Plumbing	1.60	1.20	2.19	1.88	2.30	2.37	3.30	1.45	1.64	1.23	2.47	2.14	.80	2.81	1.65	.94	1.24	2.34	1.38	1.19	.81	2.01	.98	1.80	1.21
Roofing	7.98	6.01	10.93	10.90	9.50	9.68	A	5.95	5.41	5.94	12.55	11.37	1.95	14.05	6.06	3.84	3.58	7.23	5.93	4.92	3.83	A	3.57	8.28	5.22
Sheet metal work	2.31	1.73	3.16	2.14	2.50	3.28	5.20	2.07	1.45	1.81	3.15	4.69	1.95	6.89	2.20	1.26	2.02	2.69	2.23	1.54	1.27	4.10	1.49	2.41	1.96
Steel erection—door & sash	2.68	2.02	3.67	2.49	3.50	3.45	3.60	2.49	2.86	1.77	4.42	A	3.65	7.28	2.78	1.45	2.37	2.58	1.92	1.74	1.40	A	1.81	3.26	1.69
Steel erection—interior ornament	2.68	2.02	3.67	2.49	3.50	3.45	3.60	2.49	2.86	1.77	4.42	A	3.65	7.28	2.78	1.45	2.37	2.58	1.92	1.74	1.40	A	1.81	3.26	1.69
Steel erection—structural	16.73	9.28	22.92	11.42	13.20	18.99	14.50	9.86	10.14	6.30	12.82	18.50	3.65	38.94	18.33	7.00	6.80	11.32	A	9.37	5.71	17.35	8.61	8.44	A
Steel erection—dwelling—2 stories	7.39	5.24	10.12	6.19	5.80	9.53	5.00	6.47	7.28	3.58	11.94	8.89	3.65	17.57	8.34	3.15	5.81	8.87	6.32	4.59	3.54	8.48	4.76	4.62	5.56
Steel erection—general	11.49	7.97	15.74	9.79	8.30	16.01	12.90	8.41	8.21	4.40	10.57	A	3.65	20.35	9.56	4.24	5.25	8.87	7.38	6.71	3.03	11.55	4.15	7.97	6.49
Tile work—interior	1.14	.94	1.56	1.17	1.55	1.63	2.70	.91	1.39	.83	2.00	1.55	.70	3.19	1.32	.73	1.01	1.35	2.13	.86	.63	1.46	.81	1.00	1.87
Timekeepers and watchmen	2.68	2.08	3.67	2.54	A	3.49	4.60	2.50	2.96	1.88	3.47	3.99	F	7.40	2.61	1.56	2.43	F	2.53	1.81	1.56	4.18	1.79	3.20	2.23
Waterproofing—brush	3.29	1.83	4.51	4.73	4.70	4.13	5.30	1.53	1.60	2.53	3.27	4.88	.70	5.09	2.83	1.70	1.81	2.14	2.27	1.79	1.39	4.58	1.79	2.38	2.00
Waterproofing—trowel—interior	2.31	1.41	3.16	2.17	1.95	3.51	4.40	1.18	1.69	1.15	2.56	4.18	.70	5.54	1.92	1.28	1.24	1 88	2.92	1.51	.78	3.61	1.25	1.52	2.57
Waterproofing—trowel—exterior	2.21	1.27	3.03	2.56	3.30	2.24	4.60	1.24	1.52	1.35	2.39	4.26	.70	5.27	1.14	1.02	1.10	4.06	1.79	2.11	.79	4.00	1.17	1.67	1.58
Waterproofing—pressure gun	3.95	2.81	5.41	4.14	4.90	3.15	6.00	2.68	3.04	1:80	7.41	4.89	.70	9.51	3.25	1.99	2.28	4.06	2.77	2.35	1.95	4.59	1.81	2.72	2.44
Wrecking	16 57	12.10	22.70	14.71	20.70	20.42	A	12.14	12.24	6.09	17.48	23.63	9.50	38.12	17.95	8.20	10.93	13.00	23.82	10.29	5.79	22.16	9.49	12.89	20.96

*A Specially rated—refer to company. *B Rate varies with type of work. *C Includes form work. *D Pile driving, caisson and dam work separately rated. *E Special occupational disease loadings apply. *F Assigned to main classification. *G Subscription to State Fund mandatory—Nevada, Industrial Comm., Carson City, Nev.; Workmen's Compensation Bureau, Bismark, N. Dak.; The Industrial Commission of Ohio, Columbus, Ohio; State Compensation Commission, Charleston, W. Va.; Workmen's Compensation Dept., State Treasurer's Office, Cheyenne, Wyo.

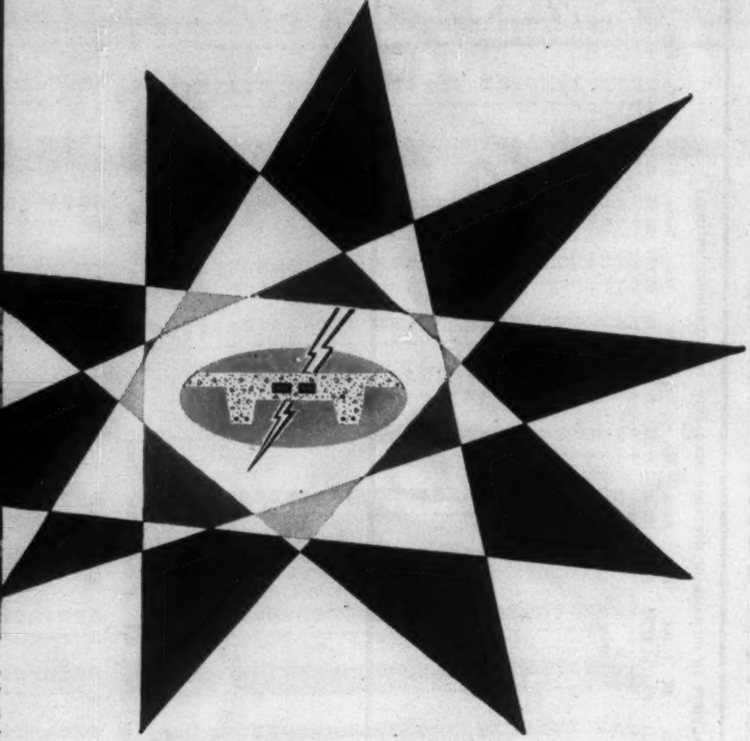
Ceco-Meyer Steelform Construction saves steel, concrete, lumber and labor. The removable steelforms are quickly installed on simple open wood centering. Cost is reduced because the same lumber steelforms are re-used from floor to floor.


THICKNESS (usually 2½", 3" or 3½")
DISTRIBUTOR DUCTS
THICKNESS + 2"
STEELFORM OF TYPICAL DEPTH
STEELFORM 2" SHALLOWER THAN TYPICAL
REINFORCED CONCRETE

Cross-section through distributor ducts, showing the strength and simplicity of R/C Duct Floors made with Ceco-Meyer Reinforced Concrete Joist Construction.



Here's a partially completed 3-duct system. The electrical ducts are installed on top of Ceco-Meyer Removable Steelforms. Concrete is poured over and around ducts. Result is monolithic floor system—no fill needed.



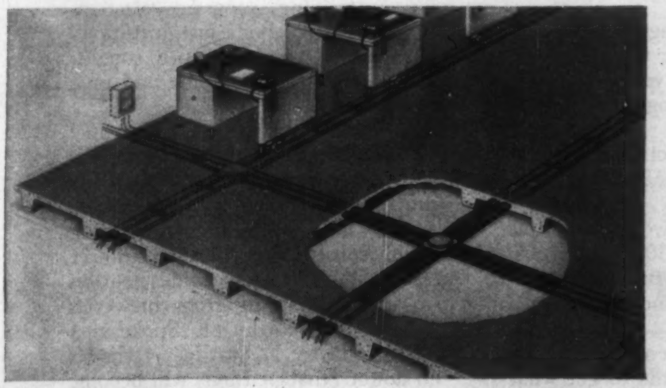
Electrified floors in reinforced concrete

...outlets every 2 feet along ducts...

Yet the cost is 19% less...due to Ceco-Meyer Steelform Construction

One of the prime necessities in buildings today is plenty of conveniently placed electrical outlets. And the most economical way to assure electrical flexibility is to build with reinforced concrete—with R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. That's how the problem was solved at the National Education Association Building, Washington, D.C., where R/C Duct Floors actually cost 60¢ per square foot less than cellular steel flooring, or a saving of 19%. In R/C Duct Floor construction, a network of steel electrical ducts is buried in the structural slab. Capped outlets every 2 feet along the ducts provide handy electrical connections for the telephones and business machines now in use. When expansion or re-arrangement is necessary, electrical equipment can be moved anywhere without costly rewiring or tearing up floors to provide electrical outlets. On your next building project, consult Ceco Engineers. They can save you money with R/C Duct construction—at the same time you get rigid Reinforced Concrete floors.

World Center Building, Washington, D.C.—another structure with the economical electrical flexibility of R/C Duct Floors provided by Ceco-Meyer Reinforced Concrete Joist Construction. Architect: Robert O. Scholz / Structural Engineer: Otto Vogt / Contractor: R.O. Scholz, Inc.



Standard electrical distribution ducts are buried in structural concrete. No additional fill or expensive topping is needed. Electrical connections are provided as close as every 2 feet along the ducts.

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ENR

Construction Labor Costs are Headed Up

The trend toward bigger wages—and more pressure on construction management and cost controls—is here to stay.

That's the view of most construction industry members, both management and labor, questioned by ENR. A highly competitive labor situation in a thriving industry and an expanding economy, they say, can promise little else.

Basic wage increases in the building trades this year have been hitting an average of 12.5 cents an hour. Two-year contracts in many areas have already set a similar pace for next year.

Apprentice training programs, with 92,000 construction workers now enrolled, still fail to meet the skilled labor needs of the industry. AFL-CIO merger plans and the "guaranteed annual wage" are crystallizing and emphasizing the "rights", the hopes and the ambitions of organized labor as a whole. And when the new federation is formed in December, organized labor will inherit a powerful and effective instrument for achieving its goals.

Coupled with the nation's general economic prosperity and that of the construction industry in particular, these factors add up to an upward surge that's strong. A few expect wages to level off in a year or two and some say "its anybody's guess"—but most see no turn in the tide unless and until an economic recession sets in.

Most of these factors were present during the collective bargaining sessions of 1955. Although the results are as heterogeneous as the industry itself, a number of significant trends occurred. Among them are these: greater stabilization of labor costs; more interest in basic rates than in fringe benefits; increasing interest in paid holidays, vacation pay and pension funds; and more understanding and cooperation on the part of both labor and management.

• **Stabilization**—Throughout the year, unions and contractors have tried in several ways to free collective bargaining—and resulting wage rates—from some of its "hit-or-miss" and "free-for-all" characteristics. Reasonable constancy, relative uniformity and fewer area differentials have been the major goals.

Widespread use of two-year contracts—now more numerous than ever before—mark the most significant trend in this direction. Out of a group of 227 contracts negotiated this year in 78 areas across the country and selected at random, half will run for two years, three for three years, two for four years, and the balance for one year. Except in isolated cases, the two-year contracts contain no reopening clause for wages.

Other efforts to stabilize labor costs were moderately successful. For example:

- Wider area bargaining was achieved in many sections of the country, and a greater expansion is predicted for the future as existing area differentials are gradually reduced. Areas in which state-wide progress was made with some of the trades included Arizona, Wisconsin and New York. Local areas were also extended for other trades in Detroit, St. Louis and New York City.
- Further standardization of wage rates and working conditions was attempted in various areas. Some success was achieved in the 29-county area in and around Philadelphia, and efforts are now underway in Baltimore to institute the "Chicago plan."
- Significant strides in across-the-board bargaining were widespread. Joint negotiations on a more inclusive scale than ever before were conducted in Akron, Cincinnati, St. Louis and Arizona.
- Uniform run-out dates for union contracts were sought in many areas and achieved in some. Although the preference in Milwaukee, Cincinnati, St. Louis and New York was for uniform May or June terminations, rollbacks to March and April were sought in sections of Colorado and New Jersey in order to pull negotiations away from peak construction periods.

The effect of these developments on the general level of wages remains to be seen. But, meanwhile, they are expected to inject more orderliness and uniformity into collective bargaining and to afford contractors a more stable and a more widely effective rate structure with which to plan and operate.

• **Basic rates and fringe benefits**—Basic rates have paced far ahead of fringe benefits during the year and most of the 1955 boost in wages falls into this category.

In one-year contracts, basic increases ranged from 2.5 to 62.5 cents, struck a 12-cent average, and most commonly hit 10 cents. In two-year contracts, they ran from 8 to 50 cents, averaged 23 cents (13 cents the first year, 10 cents the second), and struck no particular pattern.

Reasons for the trend are ill-defined. Some say "labor wants to get what it can while the getting's good." Others feel that contractors, especially the smaller ones, have grown tired of the complexity fringe benefits entail and that widespread criticism of fund management has had a dampening effect.

Home building rates have tended to keep pace with commercial rates, although home builders, as in Cleveland, tried to have their plight and problems recognized. Some areas were able to retain existing differentials, but for many home builders nonunion labor remains the key to lower building costs.

Escalator clauses, particularly those based on the cost-of-living index, were generally discarded as a governor on rising labor costs. Some chapters of the AGC tried unsuccessfully to revive their use. Even Buffalo's industry-formula began to lose favor because resulting increases were falling too far behind the national pattern. Modified forms of escalation were used in some of the longer-than-two year contracts, and growing interest was shown in tying wages to national averages, as in the new four-year Arizona carpenter's contract.

• **Fringe benefits**-Destined for bigger things in the future, fringe benefits have played a minor role. Existing benefits were generally retained; health and welfare contributions were increased in many cases to eliminate existing differentials as between various crafts; and a few trades like the Denver carpenters took their old 7.5 cent welfare contribution in cash. A provision was inserted in many two-year contracts, granting unions an election to take subsequent increases in fringe benefits instead of cash.

Where the issue was active, emphasis was on paid vacations (predominately one week), paid holidays (6 or 8), liberalized travel and subsistence allowances, and pension funds. Contribution to apprentice and journeyman training programs—strategically tied in to labor's justification of higher wages—were frequently sought, particularly in the plumbing and pipe fitting trades.

Looking to the future, some feel that pensions will be construction labor's next big demand. The feeling's strongest in the northwest, where teamsters have talked about extending to the construction industry in 11 western states the area-wide pension plan won last spring from breweries in the Pacific Northwest. Spokesmen for the industry in Seattle say there's "no doubt" that pensions will become the next big issue there. Health and welfare plans are expected to be a

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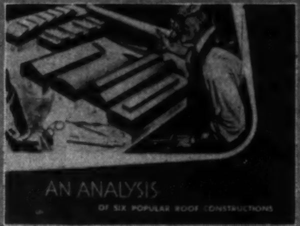

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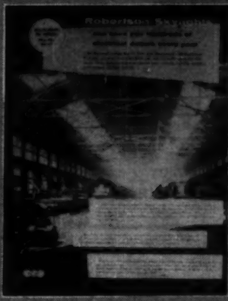
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. . . Construction Labor Costs Headed Up

source of perennial interest until workmen's compensation benefits are further liberalized and government sponsored sickness insurance programs become more universal. And some spokesmen predict that when labor can no longer push for big wage gains of the past, fringe benefits will again be on the ascendency as labor seeks to obtain the most for its money.

In detail, for 58 cities, rates and benefits resulting from 1955 bargaining to date are shown in the accompanying roundup for 27 trades.

• **Work week**—There's been little indication that a shorter work week will become a significant factor in rising labor costs—at least in the near future. Most of the talk has been in other fields and in the higher eschelons of labor. A few building trades recently won "clean up" and "rest" periods, and the issue was raised with negative results by some crafts, particularly in California, but little interest has been shown at the local level in a shorter work week as such. Some report that the issue is only temporarily a "sleeping dog" and is among labor's next demands; others agree that a shorter week may well come ahead of rate rollbacks if unemployment should rise.

• **Other factors**—To date, neither the guaranteed annual wage nor the forthcoming AFL-CIO merger are reported to have made any significant contribution to the rise in construction labor costs.

But those who initially thought that a GAW could never be adapted to the construction industry are taking another look, and various groups have had the issue up for "serious" discussion. Some contractors say it has already made the building trades more "cocky" and feel that it contributed indirectly to this year's bigger demands. One east coast contractor predicts "it won't be long" before there's some form of GAW in the industry.

The pending merger is similarly viewed with mixed emotions. While some members of labor and management see no effect on construction labor costs, others say its effeets "will be very much in evidence by 1957."

To one AFL official, the new federation means that labor "will be better able to see that the working men and women of America earn and are thus able to put into circulation a more fair share of the wealth they produce." And one contractor sums it up this way: "I'm certain the merger will bring more and more pressure on the construction industry in wages and in efforts to organize. Construction costs will go up and up."

Whether higher wages are justified will remain a controversial question, as long as there's room to argue the relative "rights" of labor and management. Current evaluations of construction labor's productivity and skill have only their lack of unanimity in common. But many do agree that today's higher wages are attracting to the construction industry men of a finer type and of greater capacity.

Few deny that the net result is a challenge to the ability and ingenuity of contractors, who are gearing themselves to greater efficiency. Many contend that the compelling need to cut labor costs requires "a contractor to go to machinery in today's market to stay in business." But as many more will deny it, pointing instead to the need of speeding up production, of easing the work of individuals, and of making up for lack of skills.

But regardless of the diversity of opinion as to whether labor costs are increasing the use of machinery and reducing the labor force, there is an evident and growing interest in simplification of designs; in tilt-up and lift-slab construction; in metal facing panels and other materials cheaper to install; in more powerful and productive types of machinery with automatic controls and greater maneuverability; and in trowel and plastering machines, pallets, hoists, conveyors and power buggies, to name a few.

Out of it all has emerged what contractors in several areas consider the most significant development of all in collective bargaining—more sincerity, understanding and cooperation on the part of both labor and management. Although labor in many instances was considered slower in settling, fewer strikes were reported this year.

But regardless of the order in which these various forces, factors and trends are tabulated and added, the sum is the same. In the words of one contractor, the result is this: "An increasingly high priced labor market can be expected."

For the wage rates to which these footnotes apply, see facing page

▲**NOTE**: Rates rounded to nearest cent *Same as craft doing work ‡7-hr day #6-hr day §Negotiating •1 Brush •2 Up to 2 tons; 2-5 tons $1.70 •3 Plus 7½¢ 10/6/55 •4 Brush. Spray $2.50 •5 Plus 5¢ 12/1/55 •6 over 1½ ton, not incl. 3 tons •7 per mo •8 Plus 10¢ 1/1/56 •9 Plus 5¢ 6/1/56 •10 Plus 7½¢ 10/1/55; 7½¢ 6/1/56 •11 eff 9/1/55 •12 Plus 7½¢ 10/1/55 in pension fund, if fund not established by that time this will go into workers pay check until established. June 1, 1956 another 5¢ increase plus 2½¢ more on pension, if adopted, if not then 7½¢ will be added to pay check •13 Plus 7¢ 6/1/56 •14 blade •15 Plus 8¢ 1/1/56; 8¢ 8/1/57 •16 Plus 2½¢ 12/1/55 •17 Res. Com'l $2.80; Industrial $2.95 •18 Plus 10¢ 12/1/55 •19 Dump. Crane $2.20; Heavy $2.30 •20 Plus 7½¢ 5/1/56 •21 Brush. Spray $2.90 •22 Plus 15¢ 7/1/56 •23 Plus 10¢ 7/1/56 •24 Plus 7½¢ 3/1/56 •25 Plus 10¢ 7/7/56 •26 Plus 8¢ 1/1/56 •27 Plus 5¢ 4/1/56; 5¢ 10/1/56 •28 Plus 7½¢ 4/1/56; 2½¢ 1/1/57 •29 Plus 5¢ 4/1/56 •30 Plus 4¢ 9/15/55 •31 Plus 3½¢ VF. 10/1/56 •32 This work done out of Birmingham •33 Plus 10¢ 1/1/56; 10¢ 7/1/56; 10¢ 1/1/57 •34 Plus 10¢ 1/1/56; 20¢ 7/1/56; 10¢ 1/1/57; 10¢ 7/1/57 •35 Plus 3% PF, 1/1/56 •36 Plus 10¢ 8/1/56 •37 Plus 10¢ 10/1/55 •38 Plus 25¢ 10/1/55; 12½¢ 7/1/56 •39 Plus 2½¢ 1/1/56 •40 Plus 10½¢ 1/1/56 •41 House. Steel $2.68 •42 Plus 7½¢ 11/1/55; 7½¢ 5/1/56; 7½¢ 11/1/56 •43 Plus 5¢ 11/1/55; 7½¢ 5/1/56 •44 Plus 14¢ 5/16/56; 10¢ 5/16/57 •45 Plus 7½¢ 1/1/56 •46 Includes 15¢ incr. eff 8/16/55; 15¢ to be added 8/16/56

▲**RANGES**: •A 1.30–1.45 •B 2.60–3.00 •C 2.05–2.60 •D 0.75–1.00 •E 0.80–1.00 •F 2.50–2.75 •G 2.53–2.97 •H 2.97–3.23 I 2.15–2.30 J 3.07–3.82 •K 1.42–1.68 •L 2.55–2.70 •M 3.25–3.40 •N 2.85–3.00

▲**BENEFITS**: •a Incl 10¢ WF •b Incl 5¢ WF •c Incl 7½¢ WF •d Incl 7¢ WF •e Incl 15¢ WF, 5¢ Advtg •f Incl 15¢ WF, 5¢ Promotion Fund •g Incl 12¢ WF •h Incl 6¢ WF •i Incl 10¢ WF, 5¢ PF, 2¢ Coordinator •j Incl 11¢ WF •k Incl 22½¢ WF •l Incl 20¢ WF •m Incl 24¢ WF •n Incl 22¢ WF •o Incl 10¢ PF •p Incl 1% PF •q Incl 16¢ WF •r Incl 9½¢ WF •s Incl 10¢ Ins., 5¢ PF •t Incl 3¢ Promotion Fund •u Incl 8¢ WF •v Plus 4% gross payroll •w Incl 10¢ H&WF, 5¢ Organization •x Incl 4% VF •y Incl 10¢ VF •z Incl 5¢ PF •aa Incl 6¢ PF, 6¢ VF •bb Incl 5¢ VF •cc Incl 6¢ VF •dd 1 wk paid vac •ee Incl 6% VF •ff Incl 12½¢ WF •gg Plus $2.25/wk WF •hh Incl 3¢ PF •ii Incl 2 3/4% WF •jj Incl 8½¢ WF •kk Incl 14¢ WF •ll Incl 5 3/4¢ WF •mm 6 PH •nn Incl 5% WF, 6 PH •oo Incl 4% WF, 20¢ PF •pp Incl 3% WF, 3% PF, 10¢ in lieu of PH •qq Incl 4% WF, 4% PF •rr Incl 5% WF, 3% PF •ss Incl 15¢ WF, 15¢ PF, 20¢ BF •tt Incl 5% W&PF, 4% VF, 1% NC, 1% Joint Industry Bd Assessment, 6 PH •uu Incl 3% WF, 5% PF •vv Incl 3% WF, 3% PF, 2% VF, 1% EF •ww Incl 5% WF, 3% BF •xx Incl 3% WF, 3% PF, 2% VF •yy Plus approx $5.30/wk W&PF •zz Incl 3% WF •aaa Incl 3% WF, 3% PF •bbb Incl 11¢ PF •ccc Incl 1% WF •ddd Incl 9¢ WF •eee Incl 10½¢ WF •fff Incl 17¢ WF •ggg Incl 10½¢ WF, 7½¢ PF •hhh Incl 15¢ WF •iii Incl 10¢ WF, 1½% PF •jjj Plus $6.50/mo per man WF •kkk Incl 11½¢ WF •lll Incl 10¢ WF, 15¢ PF •mmm Incl 18¢ WF •nnn Incl 7½¢ WF, 6½¢ VF •ooo Incl 7½¢ WF, 3% VF •ppp Incl 10¢ trust fund •qqq Incl 3½¢ WF •rrr Incl 36¢ WF •sss Incl 16½¢ WF •ttt Incl 21¢ WF •uuu Incl 4¢ Ins. Fund •vvv Incl 4% WF, 3% PF •www Incl 12% BF

▲**OVERTIME**: •a DT •b DT Sun •c DT except (DT Sat, Sun & Hol) carp, mas help, cement, elec, paint, roof, waterp, sheet met, oper engrs, tr dr •d DT all but lab, mas help, cement, paint, glaz, roof; (TH Sat. 1st 3–5 hrs work day, DT Sun) carp, elec, plumb, steamf, sheet met •e DT all but lab, mas help, tr dr •f DT brick, iron, stone mas, plast, mos & ter, tile, plumb, steamf, sheet met, weld •g DT brick, iron, stone mas, mos & ter, tile, plumb, steamf, sheet met •h DT all but (DT Sun & Hol) lab, mos & ter, tile, cement, paint, glaz, waterp •i DT except lab, paint, glaz, roof, waterp, tr dr •j DT all but (TH in excess 8 hr reg work day) elec, paint, tr dr; (TH 1st 2½ hrs) lab, mas help; (TH 4:30–7PM) cement; (DT Sat, Sun & Hol) glaz; (TH up to 12 Noon Sat) plumb; (TH before 8AM & after 4 PM, DT after midnight Sat to 6 AM Mon & Hol) steamf, welder; (TH Sat) sheet met; (TH 9th hr after reg day thereafter DT) shov oper •k DT all but lab, paint, tr oper, shov oper, tr dr •l DT all but lab, paint, tr dr (TH up to 4:30 PM) waterp •m DT all but lab, mos & ter, tile, cement, paint, glaz, roof, waterp, tr dr •n DT iron •o DT all but lab, mas help, mos & ter, tile, elec, paint, glaz, roof, waterp; (DT Sun) carp; (DT 4:30 PM Fri to 8 AM Mon) cement •p DT all but lab, cement, glaz, roof, waterp, sheet met, tr dr •q DT carp, brick, iron, stone mas, plast, mos & ter, lath, sheet met •r DT all but (DT Sun) lab, mas help; (DT Sat & Sun) mos & ter; (TH) cement, waterp, paint (old work), tr dr •s DT all but lab, mas help, mos & ter, tile, paint, tr dr; (DT Sat & Sun) cement •t DT except lab, paint •u DT except (DT Sat, Sun & Hol) mos & ter, tile, cement, elec, glaz, plumb; (DT Sun & Hol) lab, mas help, roof, waterp •v DT except lab, mas help, mos & ter, tile, paint, glaz, tr dr •w DT except (TH 6:AM Mon to 4:30 PM Fri) lab; (TH 12 Mid Mon to Fri) tile, paint; (TH 4:30 PM to 12 M Mon—Thurs) plumb, steamf; (DT Sat, Sun & Hol) roof, waterp •x DT except lab, mos & ter, tile, paint, glaz, roof, waterp, sheet met, oper engrs, tr dr; (TH 1st 3 hrs) cement •y DT carp •z DT all but (DT Sat, Sun & Hol) carp, lab, mas help, plast, mos & ter, tile, cement, lath, elec, paint, glaz, plumb, steamf, roof, waterp, sheet met, oper engrs; (TH Sat) tr dr •aa DT all but lab, mas help, cement, lath, paint, glaz, roof, waterp, sheet met, tr dr •bb DT all but (DT Sat, Sun) lab, mas help, mos & ter, tile, cement, tr dr •cc DT except (TH) elec •dd DT brick, iron, stone mas, plast, mos & ter, tile, cement, lath •ee DT except lab, mas help, mos & ter, tile, cement, elec, paint, glaz, plumb, steamf, roof, waterp, tr dr •ff DT brick, iron, stone mas, mos & ter, tile, lath, waterp •gg DT sheet met, weld, hoist engrs •hh DT except (TH) com lab hvy, cement, sheet met, oper engrs, tr dr •ii DT except (TH) tr dr •jj DT carp, brick, iron, stone mas, plast, mos & ter, tile, lath, sheet met, weld, oper engr •kk DT except (TH 1st 4 hrs) lab; (DT Hol) paint; (TH 1st 2 hrs) roof, waterp; (TH) tr dr •ll DT except cement; (TH 1st 2 hrs) glaz •mm DT all but lab, mas help, elec, sheet met, oper engrs, tr dr

Building Trades Wage Rates—August 1, 1955

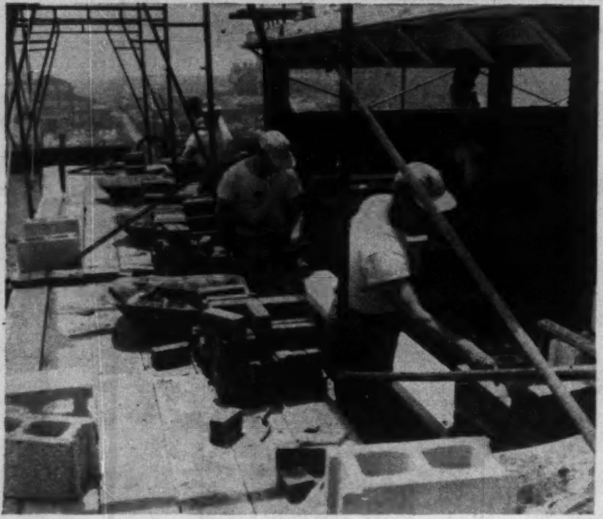
Quoted in $/hr., 8-hr. day; time and one-half for overtime after 40 hr. except where noted

Compiled by ENR City and State	Carpenters	Bricklayers	Struct Irwkrs	Reinf Irwkrs	Labor Bldg	Labor, Hwy Const	Stonemasons	Mason's Helpers	Plasterers	Mosaic & Terrazzo	Tile Layers	Cement Finishers	Lathers	Electrns (Inside)	Painters	Glaziers	Plumbers	Steamfitters	Roofers	Waterproofers	Sht Met Workers	Welders	Hoist Eng 1-Drum	Hoist Eng 2-Drum	Tract Op (30 hp+)	Shovel Operator	Truck Dr (1½T+)
Atlanta, Ga [c]	2.60	[23]3.25	2.95	2.80	1.38	1.38	3.25	1.50	2.88	3.25	3.25	2.65	2.88	3.00	[1]2.50	2.35	[a]3.15	[a]3.15	1.85	1.85	2.73	*	2.35	2.70	2.43	2.95	[3]1.50
Austin, Tex [d]	2.50	3.50	[2]2.93	[2]2.65	1.25	1.35	3.50	[A]1.30	3.18	3.00	3.00	2.50	3.18	3.00	[4]§2.25	2.25	2.93	2.93	1.65	1.65	§2.75	*	2.55	2.90	2.90	2.90	1.25
Baltimore, Md [e]	2.75	[a]3.20	[c]3.33	[c]3.08	[c]1.68	[c]1.68	[a]3.28	[c]1.83	[c]3.08	[c]2.95	[c]2.83	[c]3.08	[a]3.08	3.08	[41c]2.60	[c]2.55	[c]3.08	[a]3.08	2.25	2.25	[a]3.08	*	[L]2.55	[M]3.25	[N]2.85	[M]3.25	[c]1.83
Billings, Mont [f]	2.60	3.00	3.00	3.00	2.00	2.00	3.00	2.37	3.00	3.00	3.00	2.63	2.85	2.90	2.50	2.45	2.90	2.90	2.40	2.40	[b]2.65	[b]3.05	2.38	2.60	2.60	[B]2.60	2.09
Birmingham, Ala [g]	[11]2.60	3.25	[c]2.93	[c]2.93	1.38	1.48	3.25	1.38	[11]2.82	2.90	2.90	[11]2.68	2.25	[c]3.08	2.60	2.45	[c]3.13	[c]3.13	[c]2.36	[c]2.36	[bc]2.88	*	2.32	2.60	2.46	2.60	[8]1.85
Bismark, N D	2.20	3.00	2.70	2.60	1.50	1.50	3.00	1.70	2.75	....	3.00	2.25	1.75	2.35	2.05	2.05	2.37	2.37	2.00	2.00	2.25	*	2.00	2.15	2.00	2.25	1.50
Boise, Idaho	2.50	3.10	3.00	2.75	1.95	1.95	3.10	2.35	2.90	3.10	....	2.60	2.76	2.70	2.50	[7]377.50	[8]2.90	[8]2.90	[8]2.35	....	2.55	3.00	2.25	2.35	2.55	2.60	[C]2.05
Boston, Mass [h]	[c]2.93	[a]3.35	[c]3.48	[c]3.48	[d]2.22	[d]2.22	[a]3.35	[d]2.22	[a]3.45	3.25	3.25	[a]3.39	[f]3.45	[c]3.12	[a]2.70	[h]2.74	[c]3.22	[c]3.22	[a]2.98	[a]3.39	[i]3.11	[i]3.11	3.40	3.40	3.03	3.40	2.20
Buffalo	3.11	3.45	[c]3.27	[c]3.27	2.36	2.36	3.45	....	3.37	3.13	3.13	3.09	3.30	[48]3.30	[ff]3.00	....	[ac]3.30	[18]3.23	3.06	....	3.23	....	3.26	3.26	....	....	....
Charleston, S C	2.25	2.75	2.75	2.50	1.00	1.00	2.75	1.15	2.50	2.50	2.50	2.00	2.50	2.75	1.75	1.75	2.75	2.75	1.75	1.75	2.50	2.25	2.00	2.55	2.00	2.40	1.25
Charleston, W Va [i]	2.93	3.40	[c]3.18	[c]3.18	[45]1.93	1.85	3.40	[45]2.08	3.00	3.05	3.05	2.90	2.90	3.00	[1]2.50	2.40	3.05	3.05	2.50	2.50	2.82	*	2.85	3.00	2.50	3.05	2.05
Chicago, Ill [j]	[10a]3.30	[10c]3.55	[c]3.50	[11a]3.50	[10c]2.50	[10c]2.50	[10c]3.55	[10c]2.50	[§k]3.63	§3.30	[c]3.38	[12a]3.30	[k]3.63	[§l]3.53	[c]3.20	[a]3.52	[m]3.44	[a]3.44	[§a]3.45	[§a]3.45	[13co]3.36	[a]3.44	[10b]3.15	[10b]3.15	[14b]2.90	[11g][b]3.50	2.12
Cincinnati, Ohio [k]	3.15	[5]3.40	[c]3.28	[c]3.11	2.20	2.10	[5]3.40	2.40	3.23	[16]3.18	[16]3.18	[5]2.95	3.18	[§a]3.28	[17]2.65	3.05	[a]3.29	[r]3.45	[18]2.85	[a]3.15	[a]3.15	*	2.93	3.18	2.93	3.18	[19]2.10
Cleveland, Ohio [l]	3.40	[20c]3.45	[c]3.40	[c]3.40	2.65	2.65	[c]3.18	§2.63	[20]3.40	3.15	3.23	[11]3.40	3.40	3.43	[1a]3.23	[a]3.33	[20a]3.40	[20a]3.40	3.40	3.40	3.33	3.15	[20]3.28	[20]3.28	3.15	[20]3.40	[a]2.42
Columbus, Ohio [m]	2.85	3.40	[c]3.18	[c]3.18	2.00	2.00	3.30	2.15	[c]3.03	2.75	2.75	2.85	[f]3.03	3.18	[21]2.60	2.48	3.15	[c]3.18	§2.75	§2.93	[c]3.00	[c]3.18	2.93	2.93	3.18	3.18	2.00
Concord, N H [n]	2.38	3.25	3.20	3.20	2.00	2.00	3.25	2.00	3.25	3.25	3.25	3.25	3.25	2.40	1.80	2.00	2.45	2.45	2.00	....	2.00	....	2.85	2.85	2.40	2.85	....
Dallas, Tex [o]	2.88	3.63	2.95	2.68	1.50	1.50	3.63	1.65	3.44	2.90	2.90	2.88	3.44	3.00	2.75	[22u]2.61	[a]3.19	[a]3.19	[22]2.25	2.25	3.00	2.95	2.95	2.95	2.63	2.63	1.50
Dayton, Ohio [p]	2.95	3.47	[c]3.20	[c]3.03	2.13	2.10	3.47	....	3.12	3.20	3.20	2.77	3.15	3.34	2.82	2.70	3.25	3.25	2.95	2.73	2.95	[c]3.20	2.95	2.95	2.60	3.23	2.24
Denver, Colo [q]	2.98	3.50	[c]2.93	[c]2.93	1.93	1.93	3.50	2.35	[c]3.38	3.20	[a]2.80	[24]2.90	3.38	[a]3.00	§2.85	[25]2.63	[a]3.20	[a]3.20	§2.85	§2.85	[26]3.02	*	2.66	2.83	2.66	2.83	2.05
Des Moines, Iowa	2.90	3.65	3.00	3.00	2.15	2.15	3.65	2.25	3.00	3.00	3.00	2.93	2.98	3.20	2.63	2.45	3.29	3.29	2.40	....	3.00	*	2.80	3.00	3.00	3.00	2.25
Detroit, Mich [r]	[aa]3.32	[aa]3.58	[aa]3.48	[aa]3.07	[abb]2.55	[a]2.55	[aa]3.58	[abb]2.55	[aa]3.49	[a]3.31	[a]3.31	[aaa]3.17	[a]3.58	[daa]3.62	[a]3.08	[dd]2.83	[d]3.40	[d]3.37	[ff]3.35	[a]3.11	[aa]3.47	*	[a]3.30	[a]3.30	[a]3.30	[a]3.30	[ee]2.35
Duluth, Minn [b]	[c]2.77	3.15	3.05	2.80	[c]2.03	[c]2.13	3.15	[c]2.13	3.00	....	[bb]2.63	[a]2.51	2.88	[cyhh]3.11	[c]2.58	[c]2.40	2.88	2.88	[c]2.70	[c]2.51	[c]2.78	*	2.85	2.85	....	3.07	2.07
Fort Worth, Tex [s]	2.75	3.69	2.95	2.68	1.25	1.25	3.69	1.50	3.38	2.88	2.88	2.63	3.38	3.13	2.63	§2.90	§2.90	§2.90	2.33	2.48	[c]3.00	2.95	2.73	3.00	3.00	3.00	1.75
Harrisburg, Pa [t]	[c]2.98	3.25	[mmm]3.50	[mmm]3.25	[qqq]1.84	[qqq]1.84	3.25	1.95	[qqq]2.91	2.88	2.88	[qqq]2.88	[qqh]2.91	3.00	2.25	[h]2.46	2.90	2.90	2.35	2.05	[a]2.85	*	[a]3.45	[a]3.45	[a]3.08	[a]3.70	[qqq]1.99
Helena, Mont	2.60	3.00	2.75	2.75	1.90	1.90	3.13	2.08	3.00	3.13	3.13	3.00	3.00	2.75	2.50	2.35	2.90	2.90	2.65	....	2.65	....	2.28	2.50	2.50	2.50	2.00
Houston, Tex [u]	2.95	3.43	[c]3.08	[c]2.83	1.73	....	3.43	1.90	[eee]3.36	2.90	2.90	2.95	[eee]3.36	[hhh]3.28	2.63	2.63	3.10	[c]3.05	2.63	2.63	[c]3.20	....	2.65	3.15	3.15	3.15	1.93
Indianapolis	3.10	3.45	[c]3.23	[c]3.23	2.15	[c]1.83	3.45	2.32	3.25	3.20	3.20	2.80	3.08	3.28	2.80	2.99	3.20	3.20	2.46	....	3.08	....	3.13	3.13	3.13	3.13	2.20
Jackson, Miss	2.43	3.00	2.80	2.55	1.20	1.20	....	....	2.63	....	....	2.55	2.50	2.75	[1]2.25	....	2.96	....	1.90	1.90	2.65	....	2.35	2.35	2.35	2.60	1.55
Jacksonville, Fla [v]	2.55	3.05	2.81	2.55	1.00	1.00	3.05	1.10	2.80	2.63	2.63	2.23	2.80	3.10	[1]2.33	2.37	3.10	3.10	2.30	2.30	§2.50	*	2.50	2.50	2.09	2.50	1.50
Kansas City, Mo [w]	[27]2.85	3.63	[28]3.00	[28]2.85	2.11	2.13	3.25	2.16	[29]3.33	3.18	3.18	2.85	3.08	[a]3.23	2.66	2.80	[c]3.23	[c]3.23	2.58	2.58	[c]3.14	*	[29]2.80	[29]3.05	[29]2.25	[29]3.05	[29]2.07
Los Angeles, Calif [x]	[30a]2.96	3.60	[46c]3.33	[46c]3.08	[30c]2.24	[30c]2.24	3.60	[c]2.58	[11ff]3.75	[ii]3.18	[ii]3.18	[30a]2.89	[11ff]3.75	3.25	[‡ii]2.99	[ddc]2.78	[a]3.44	[a]3.44	[ii]2.94	[ii]2.94	[31jj]3.21	*	[a]2.79	[a]2.79	[a]2.87	[38c][a]3.10	2.34
Louisville, Ky [a]	3.00	3.40	3.05	3.05	2.00	2.00	3.40	2.25	3.21	2.82	2.82	3.00	3.00	3.05	2.65	2.50	3.18	3.18	2.20	2.20	2.80	*	3.00	3.00	....	3.00	2.26
Meridian, Miss [y]	2.25	2.75	[32]....	[32]....	1.10	[D]0.75	3.00	[B]0.80	2.35	[F]2.50	[F]2.50	2.35	2.25	2.78	2.00	2.25	2.50	2.50	2.00	2.35	2.50	2.50	[32]....	[32]....	2.00	2.00	....
Milwaukee, Wis	[d]3.06	[d]3.32	[d]3.02	[d]3.02	[d]2.30	....	[d]3.32	[d]2.41	[d]3.12	[kk]3.25	[kk]3.14	[d]2.82	[kk]3.19	[11]3.06	[d]2.67	....	[d]3.12	[d]3.12	[e]2.70	[d]2.69	[d]2.92	[d]3.04	[d]2.92	[d]2.92	[d]3.08	[d]3.25	[ee]2.24
Minneapolis, Minn [z]	2.90	3.33	3.07	3.07	2.15	2.15	3.33	[mm]2.47	[ac]3.13	2.83	[mm]2.78	[35]3.00	[ac]3.13	[pues]3.29	2.75	[35b]2.61	[c]3.08	[c]3.08	2.75	2.75	[c]2.98	*	2.85	2.85	[G]2.53	[H]2.97	[I]2.15
Nashville, Tenn [aa]	2.43	3.15	2.75	2.60	1.20	1.60	3.15	1.35	2.75	2.93	2.93	2.25	2.88	2.85	[1]2.35	2.18	2.93	2.93	2.15	2.15	2.60	....	2.10	2.35	2.10	2.55	1.50
New Orleans, La [bb]	2.60	3.18	[c]2.98	[c]2.67	1.48	1.48	3.18	1.43	2.80	2.76	2.76	2.55	[b]2.65	[c]3.10	2.28	2.50	[a]3.10	[a]3.10	[c]2.61	....	[c]2.78	[c]2.78	2.80	2.80	2.15	2.80	1.58
New York City [cc]	[‡33nn]3.73	[‡oo]4.15	[34pp]4.08	[33qq]3.83	[33rr]2.59	[33rr]2.59	....	....	[§ss]4.35	[uu]3.56	[ee]3.73	[‡33qq]3.73	[‡33qq]3.73	[tt]3.66	[§vvv]3.29	[‡33uu]3.83	[www]4.09	[‡33xx]3.98	[33ww]3.83	....	[‡33zz]3.94	....	[33nn]3.99	[33nn]3.99	[33nn]3.33	[33nn]4.25	[ee]2.12
Newark, N J [a]	[‡ss]3.61	[‡ss]3.86	[aaa]3.98	....	‡2.80	....	....	....	[‡ss]3.86	....	....	[‡ss]3.86	[‡a]3.60	[yaa]3.80	[‡abbb]3.71	....	[aaa]3.71	[aaa]3.71	[‡ff]3.58	....	[‡aaa]3.60	....	....	....	....	....	....
Ogden, Utah	2.60	3.13	[c]2.88	[c]2.88	1.88	1.88	3.13	2.30	3.13	2.73	2.73	2.60	3.00	[y]2.91	[ddd]2.59	2.22	[11eee]3.01	[eee]2.96	2.50	2.50	[ff]2.73	....	2.43	2.65	2.60	2.75	1.95
Oklahoma City [dd]	2.73	3.50	2.80	2.80	1.70	1.00	3.50	1.85	3.30	2.75	2.75	2.75	3.30	3.13	2.45	2.36	3.05	3.05	2.40	2.40	2.90	....	2.45	2.45	2.23	2.50	1.85
Omaha, Nebr [ee]	2.75	3.23	2.90	2.90	1.90	1.90	3.23	1.90	3.10	2.85	2.85	2.70	2.95	3.15	2.40	2.48	[c]3.13	[c]3.13	2.25	2.25	2.75	2.90	2.45	2.45	2.90	2.90	1.90
Philadelphia [a]	3.30	[‡fff]3.92	[ggg]3.73	[ggg]3.38	2.03	2.33	3.35	2.03	[hhh]3.65	§3.33	[ff]3.38	3.30	[ff]3.50	[iii]3.81	[1a]2.80	[jjj]3.00	[kkk]3.62	[kkk]3.62	[37a]3.15	[37a]3.15	[lll]3.61	*	[aJ]3.07	[aJ]3.07	[aJ]3.07	[aJ]3.07	2.33
Phoenix, Ariz [ff]	2.85	§3.50	[a]3.18	[c]2.93	2.08	2.45	§3.50	2.45	3.30	§3.50	3.40	2.83	3.30	§3.30	[a]2.75	2.40	[a]3.05	[a]3.05	2.58	§3.50	[ii]3.09	2.85	2.70	2.85	2.85	3.03	2.18
Pittsburgh, Pa [gg]	[c]3.28	[c]3.63	[c]3.35	[c]3.35	[c]2.18	[a]2.08	[c]3.20	[c]2.58	[a]3.48	[c]3.39	[c]3.28	[c]3.28	[c]3.48	3.50	[a]2.95	3.00	[c]3.45	[c]3.43	[c]3.15	[c]3.03	[c]3.33	[c]3.33	[c]3.43	[a]3.43	[c]3.43	[a]3.43	[c]2.20
Portland, Ore [hh]	2.75	[a]3.50	[a]3.07	[a]2.87	[a]2.23	[a]2.23	[a]3.50	2.60	[a]3.25	2.90	3.05	2.80	[a]3.15	[a]3.05	[c]2.63	[a]2.73	[x]3.15	3.05	[c]2.83	[c]2.83	[nnn]2.99	*	[a]2.58	[a]2.88	....	....	[c]2.23
Providence, R I [ii]	3.63	3.23	3.15	3.15	1.98	1.98	3.15	2.83	3.20	2.88	2.88	2.83	‡3.15	2.75	2.36	2.63	2.90	3.00	2.60	3.00	2.80	2.80	3.40	3.40	....	....	2.07
St Louis, Mo [a]	[c]3.23	[ooo]3.63	[c]3.23	[c]3.23	[c]2.28	[c]2.28	[ooo]3.63	[c]2.73	[c]3.50	3.30	§[c]3.08	[§ppp]3.25	§[c]3.25	[pue]3.60	[1c]3.03	[a]3.35	[i]3.50	3.50	[b]3.10	[b]3.10	[kk]3.50	*	2.68	3.23	3.23	3.23	[a]2.88
St Paul, Minn [z]	2.90	3.33	3.07	3.07	2.15	2.15	3.33	[mm]2.47	[ac]3.28	§2.73	[mm]2.78	3.00	[ac]3.13	[pues]3.29	2.75	[b]2.61	[c]3.08	[a]3.08	2.75	2.75	[c]2.98	*	2.85	2.85	[G]2.53	[H]2.97	[I]2.15
Salt Lake City	2.60	3.13	[c]2.88	[c]2.88	1.88	1.88	3.13	2.30	3.13	2.63	2.63	2.60	3.13	2.88	2.59	2.35	2.96	2.96	2.50	2.50	2.73	3.20	2.43	2.65	2.60	2.75	1.93
San Antonio Tex [jj]	2.65	3.25	2.88	2.88	1.30	1.30	3.25	[K]1.42	3.18	2.25	2.25	2.50	3.18	3.00	[1]2.38	2.38	2.90	2.90	1.80	1.80	[39]2.75	2.25	2.30	2.65	2.30	2.65	....
San Diego, Calif [x]	[a]2.94	3.50	[c]3.18	[c]2.93	[c]2.24	[c]2.24	3.50	[c]2.58	[a]3.60	3.13	3.13	[a]2.89	[a]3.60	[a]3.25	[‡a]2.90	[c]2.78	[a]3.44	[a]3.44	3.00	[a]3.35	[ii]3.19	[a]2.95	[a]2.79	[a]2.79	[a]2.87	[a]3.10	[a]2.34
San Francisco [kk]	[‡a][a]3.16	3.75	[dc][a]3.35	2.93	[a]2.28	[‡a][a]2.28	3.75	....	[‡a][a]3.66	3.08	[c]3.18	[a]2.95	[c]3.51	[l]3.35	[‡ii]3.01	[c]2.83	[rrr]3.56	[rrr]3.56	[hhh]2.90	[hhh]2.90	[sss]3.24	[c]3.33	[a]2.96	[a]3.02	[a]3.07	3.23[c]	[C]2.38
Seattle, Wash [ll]	[a]2.76	[a]3.50	[bo]3.07	[a]2.87	[a]2.35	[a]2.35	[a]3.50	[a]2.65	[a]3.25	[a]3.10	[a]3.15	2.72	[a]3.15	[§c cc]3.14	[c]2.71	[39c]2.57	[fff]3.31	[fff]3.31	2.75	2.75	[kk]3.13	[c]3.20	[a]3.00	[a]3.00	[a]2.95	[40c][a]3.30	2.60
Toledo, Ohio	[42d]3.25	[43d]3.46	[43d]3.35	[43d]3.22	[43d]2.47	[43d]2.47	[43d]3.46	[43d]2.60	[43d]3.35	[43d]3.46	[43d]3.46	[43d]3.35	[43d]3.35	[43d]3.35	[1 43d]2.97	2.70	[43d]3.35	[43d]3.35	[43d]3.15	[43d]3.15	[43d]3.15	[43d]3.35	[43mm]3.14	[43mm]3.14	[43mm]3.00	[43mm]3.28	[44ggmm]2.17
Topeka, Kans	2.60	3.40	3.00	2.85	....	....	3.25	....	3.00	3.25	2.75	2.76	2.63	3.00	[1]2.50	2.40	3.00	3.60	2.30	2.30	2.71	....	2.35	2.75	....	....	....
Trenton, N J [a]	3.28	[ff]3.48	[ggg]3.93	[ggg]3.93	2.25	....	[ff]3.48	....	[ff]3.48	[ff]3.48	[ff]3.48	[ff]3.48	3.15	[ap]3.76	2.73	§2.75	[ao]3.60	[ao]3.60	[ao]3.40	[ao]3.40	[ao]3.65	[a]3.60	[a]3.85	[a]3.85	[a]4.00	[a]4.00	2.24
Tulsa, Okla [mm]	2.78	3.50	2.82	2.82	1.75	1.00	3.50	1.90	3.25	2.90	2.90	2.93	3.00	3.13	2.70	2.50	3.07	3.07	2.40	2.40	2.95	....	2.45	2.45	2.18	2.45	2.10

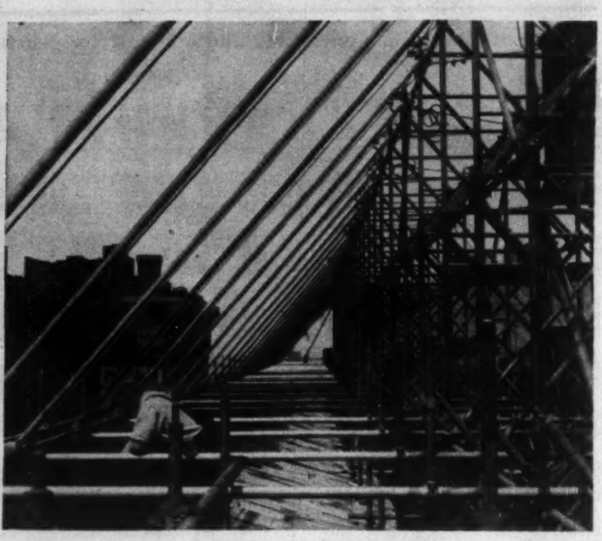
For footnotes, see facing page. These cover variations from the 8-hour day, time-and-a-half for overtime after 40 hours and the amounts included in these rates that are paid in the form of fringe benefits

(Advertisement)

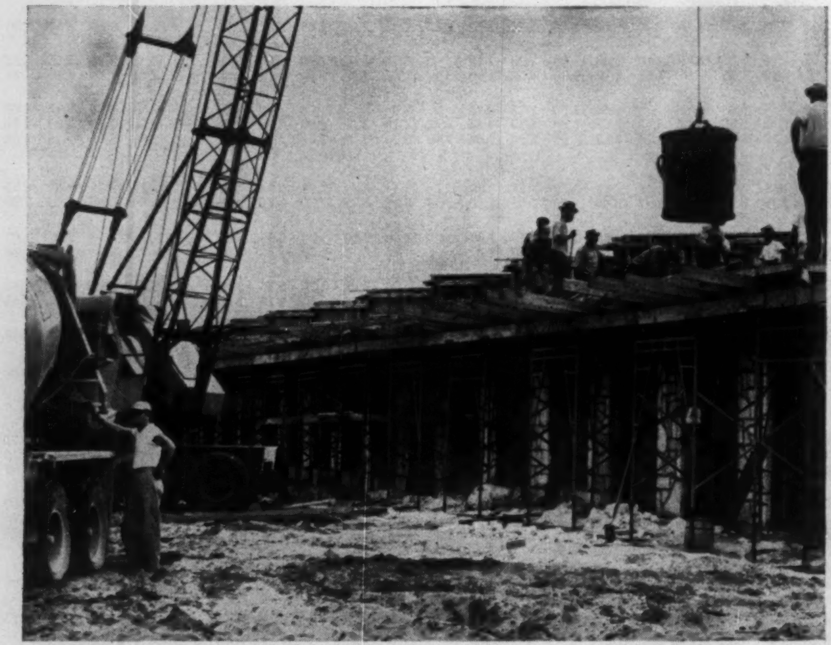
Scaffolding Methods . . . by Patent Scaffolding Co.



WITHIN EASY REACH—Separate 20"-wide platform, laid on sidewall brackets attached to "Trouble Saver"® Sectional Steel Scaffold, keeps materials easy to reach and men at most convenient working level. General contractor Damon G. Douglas uses this equipment for new elevator shaft at Hyatt Roller Bearing plant in Harrison, N. J.



OVER AND OUT—To remove cornice stones on an 18-story New York City building without disturbing a 6-ft. parapet wall, J. H. Taylor Construction Co. uses "TubeLox"® tube and coupler Scaffolding and cantilevered it 6 ft. beyond the wall. Steel cables, supporting a hanging, two-level "TubeLox" Scaffold below the cornice, run up over the framework and are anchored to the roof.



CONCRETE SHORING—Forms for the entire roof and all girders on the Northwest Dade Junior High School, Miami, are shored with 5'-wide "Trouble Saver" end frames, varying in height from 3' to 6'6". U-heads and extension legs in frame legs speed the installation of stringers. Thompson-Polizzi Construction Co., Miami, is the general contractor on this project. "Trouble Saver" Shoring, in addition to cutting shoring costs, provides a ready-made scaffold for stripping of forms or removing pans.

SEATTLE STONE—Four-story addition to the Bon Marche building in Seattle is faced with local cast stone by Bennett Campbell, Inc., general contractor. 88 6'6"-wide "Gold Medal"® Suspended Machines are used to scaffold two sides at a time.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

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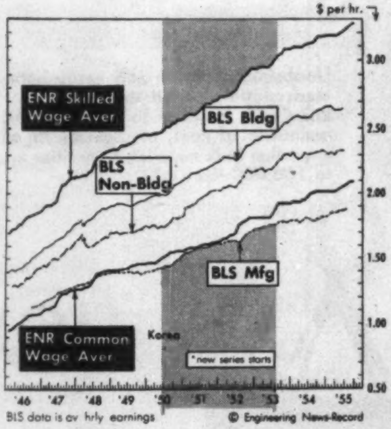

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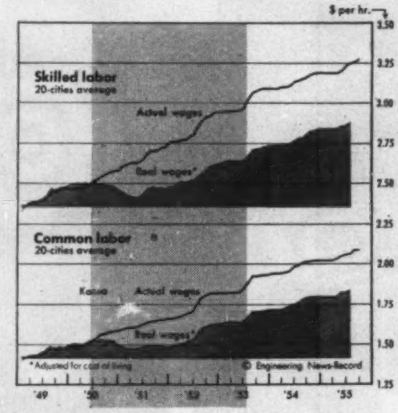

*Adjusted for cost of living

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Construction Wages—ENR 20-Cities Averages

SKILLED LABOR, dollars per hour

(Bricklayer, carpenter, ironworker average)

	1926	1932	1939	1945	1946	1949	1950	1953	1954	1955
J	1.24	1.15	1.43	1.64	1.70	2.35	2.46	2.94	3.09	3.19
F	1.24	1.11	1.43	1.64	1.73	2.35	2.47	2.95	3.09	3.19
M	1.24	1.11	1.43	1.64	1.74	2.38	2.47	2.95	3.10	3.19
A	1.25	.95	1.44	1.65	1.76	2.38	2.48	2.95	3.10	3.19
M	1.26	.96	1.44	1.65	1.77	2.38	2.48	2.96	3.11	3.21
J	1.27	.99	1.44	1.66	1.80	2.39	2.52	2.98	3.13	3.23
J	1.27	1.00	1.44	1.66	1.82	2.41	2.52	3.02	3.14	3.25
A	1.28	.98	1.44	1.67	1.83	2.44	2.54	3.06	3.15	3.26
S	1.28	.99	1.44	1.67	1.84	2.45	2.55	3.07	3.17	...
O	1.29	.98	1.44	1.67	1.85	2.46	2.56	3.08	3.18	...
N	1.29	.97	1.46	1.68	1.86	2.46	2.57	3.08	3.18	...
D	1.29	.98	1.46	1.68	1.87	2.46	2.58	3.08	3.19	...
Av	**1.27**	**1.02**	**1.44**	**1.66**	**1.80**	**2.41**	**2.52**	**3.01**	**3.14**	...

COMMON LABOR, dollars per hour

(Building and heavy construction average)

	1926	1932	1939	1945	1946	1949	1950	1953	1954	1955
J	.54	.45	.68	.89	.95	1.42	1.49	1.82	1.95	2.02
F	.54	.45	.68	.89	.97	1.42	1.49	1.82	1.95	2.02
M	.54	.44	.68	.89	.99	1.42	1.49	1.82	1.95	2.02
A	.54	.41	.68	.90	1.00	1.43	1.49	1.83	1.95	2.03
M	.55	[illegible]	.68	.91	1.02	1.43	1.51	1.83	1.97	2.05
J	.55	.41	.68	.92	1.03	1.44	1.53	1.86	1.98	2.06
J	.55	.41	.68	.92	1.06	1.47	1.54	1.88	2.00	2.07
A	.56	.42	.69	.92	1.07	1.47	1.56	1.93	2.01	2.09
S	.56	.43	.69	.92	1.07	1.48	1.56	1.93	2.01	...
O	.55	.43	.69	.92	1.07	1.48	1.57	1.93	2.02	...
N	.56	.43	.69	.92	1.08	1.48	1.58	1.93	2.02	...
D	.56	.43	.69	.94	1.09	1.48	1.58	1.93	2.02	...
Av	**.55**	**.43**	**.68**	**.91**	**1.03**	**1.45**	**1.53**	**1.88**	**1.98**	...

Averages include fringe benefits—see 1955 wage table by trades for each of 20 cities for nature and extent of these—welfare fund, pension fund and others.

Skilled and Common Wages in 20 Cities

ENR 20-Cities, U. S.	Hrs per day	Bricklayers 1954 Low	Bricklayers 1954 Aver	Bricklayers 1954 High	Carpenters 1954 Low	Carpenters 1954 Aver	Carpenters 1954 High	Structural Ironworkers 1954 Low	Structural Ironworkers 1954 Aver	Structural Ironworkers 1954 High	Common labor (Av bldg & heavy constr) 1954 Low	Common labor (Av bldg & heavy constr) 1954 Aver	Common labor (Av bldg & heavy constr) 1954 High
Atlanta	8	$3.10	$3.10	$3.10	$2.50	$2.50	$2.50	$2.75	$2.783	$2.85	$1.28	$1.297	$1.33
Baltimore	8	3.20[a]	3.20	3.20[a]	2.75	2.75	2.75	3.275[d]	3.279	3.325[d]	1.675[d]	1.675	1.675[d]
Birmingham	8	3.15	3.175	3.25	2.40	2.425	2.50	2.825[c]	2.85	2.925[c]	1.35	1.369	1.425
Boston	8	3.185[b]	3.185	3.185[b]	2.75	2.75	2.75	3.15[d]	3.181	3.275[d]	1.99[p]	2.09	2.14[q]
Chicago	8	3.40[c]	3.475	3.55[c]	3.15[b]	3.225	3.30[b]	3.20[m]	3.289	3.34[m]	2.35[c]	2.435	2.50[c]
Cincinnati	8	3.225	3.275	3.325	2.875	2.975	3.075	2.99[c]	3.038	3.19[c]	2.02	2.045	2.07
Cleveland	8	3.25[d]	3.302	3.375[d]	3.20	3.252	3.325	3.20[d]	3.252	3.325[d]	2.45	2.502	2.575
Dallas	8	3.50	3.50	3.50	2.625	2.667	2.75	2.75	2.823	2.875	1.40	1.421	1.45
Denver	8	3.50	3.50	3.50	2.775	2.806	2.85	2.75	2.783	2.85	1.80	1.831	1.875
Detroit	8	3.33[e]	3.40	3.45[b,f]	3.08[e]	3.147	3.21[e]	3.23[e]	3.28	3.33[e]	2.28[r]	2.371	2.45[b]
Kansas City	8	3.625	3.625	3.625	2.675	2.725	2.75	2.805	2.868	2.90	1.98	2.025	2.042
Los Angeles	8	3.285[g]	3.323	3.40	2.70	2.742	2.825	2.925[c]	3.002	3.175[c]	2.05	2.092	2.15
Minneapolis	8	3.125	3.183	3.225	2.70	2.758	2.80	2.82	2.883	2.97	1.95	2.008	2.05
New Orleans	8	3.05	3.079	3.10	2.42	2.458	2.52	2.80[m]	2.838	2.90[m]	1.375	1.404	1.425
New York	7	3.87[h]	4.033	4.15[h]	3.57[i]	3.57	3.57[i]	3.975[n]	3.975	3.975[n]	2.415[l]	2.415	2.415[l]
Philadelphia	8	3.62[j]	3.82	3.92[j]	3.10	3.167	3.20	3.51[o]	3.55	3.63[o]	2.025	2.075	2.10
Pittsburgh	8	3.475[c]	3.579	3.625[c]	3.20[c]	3.20	3.20[c]	3.225[c]	3.225	3.225[c]	2.04[c]	2.04	2.04[c]
St. Louis	8	3.62[c,k]	3.62	3.62[c,k]	2.975[c]	3.075	3.125[c]	3.10[c]	3.10	3.10[c]	2.095[c]	2.148	2.175[c]
San Francisco	8	3.475[c]	3.533	3.65[b]	2.905	2.943	2.98	3.075[c]	3.10	3.175[c]	2.075[c]	2.117	2.15[c]
Seattle	8	3.30	3.383	3.40[a]	2.75[a]	2.75	2.75[a]	2.78	2.922	2.95[a]	2.30	2.317	2.35
Montreal, Can.	8	2.00	2.00	2.00	1.80	1.80	1.80	1.90	1.90	1.90	1.25	1.25	1.25

[a] Incl 10¢ H&WF
[b] Incl 10¢ WF
[c] Incl 7½¢ WF
[d] Incl 7½¢ H&WF
[e] Incl 8¢ WF
[f] Incl 10¢ VF
[g] Incl 11¢ H&WF
[h] Incl 3% WF, 20¢ PF
[i] Incl 12¢ WF, 15¢ PF
[j] Incl 17¢ WF
[k] Incl 3% VF
[l] Incl 5% WF
[m] Incl 5¢ WF
[n] Incl 3% WF, 3% PF
[o] Incl 10½¢ WF, 7½¢ PF
[p] Incl 6¢ H&WF
[q] Incl 7¢ H&WF
[r] Incl 8¢ WF

Wage Rates Including Benefits—New York City

Dollars per hour

Year	Carpenters	Bricklayers	Masons' Laborers	Common Laborers	Structural Ironwkrs
1874...	$0.23 (10 hrs.)	$0.43 (8 hrs.)	$0.18 (8 hrs.)	$0.14 (10 hrs.)	....
1890...	0.43 (8 hrs.)	0.47 (8 hrs.)	0.28 (8 hrs.)	0.14 (9 hrs.)	....
1907...	0.63	0.70	0.38	0.22 (8 hrs.)	$0.60 (8 hrs.)
1913...	0.63	0.70	0.38	0.23	0.63
1930...	1.65	1.93	1.03	1.03	1.93
1932...	1.33 (7 hrs.)	1.47 (7 hrs.)	1.00 (7 hrs.)	0.65	1.68
1938...	1.75	1.89	1.00	0.91	1.93
1939...	1.75	1.89	1.03	0.91	1.93
1942...	1.85	2.00	1.03	0.95	2.00
1946...	2.10	2.25	1.23	1.20	2.25
1947...	2.47	2.65	1.44	1.44	2.56
1948...	2.73	2.94	1.62	1.63	2.98
1949...	2.75	3.20	1.70	1.70	3.00
1950...	2.88*	3.30*	1.802*	1.802*	3.14*
1951...	3.09*	3.548*	1.957*	1.957*	3.348*
1952...	3.152*	3.674*	2.021*	2.021*	3.411*
1953...	3.335*	3.858*	2.184*	2.184*	3.591*
1954...	3.57*	4.033*	2.415*	2.415*	3.975*

* Incl benefits after Sept. 1950

- **NYC workers get these benefits under new 1955 wage contracts. For benefits under previous contract see page 155, Oct. 7, 1954.**
- **WELFARE:** 5%—carpenters, common labor**, roofers**, waterproofers, hoisting engineers, shovel operators; 4%—bricklayers, reinforcing ironworkers*, cement finishers*, lathers*, painters**; 3%—structural ironworkers**, mosaic & terrazzo**, glaziers†, steamfitters**, sheet metal workers**; 15¢ hr—plasterers; 6% welfare and pension—tile layers; 5% welfare and pension, 1% national contribution—electricians; 12% fringe benefits—plumbers.

† Also 5% pension; * 4% pension; ** 3% pension.

- **PENSION:** 20¢ hr—bricklayers; 5%, 4%, 3%—see welfare; 15¢ hr—plasterers
- **BENEFIT FUND:** 20¢ hr—plasterers; 3%—waterproofers
- **VACATION FUND:** 4%—electricians; 2% steamfitters, sheet metal workers
- **PAID HOLIDAYS:** 6 ea—carpenters, electricians, hoisting engineers, tractor operators, power shovel operators
- **COST OF LIVING ESCALATORS:** most trades
- **CONTRACT STATUS:** carpenters, reinforcing ironworkers, common labor, cement finishers, lathers, glaziers, plumbers, roofers, waterproofers, sheet metal workers, hoisting engineers, mosaic & terrazzo, steamfitters, expire 6/30/57; bricklayers, 6/30/56; structural ironworkers, 6/30/58

Consumer Price Index

US Bu of Labor Statistics—1947-49 = 100

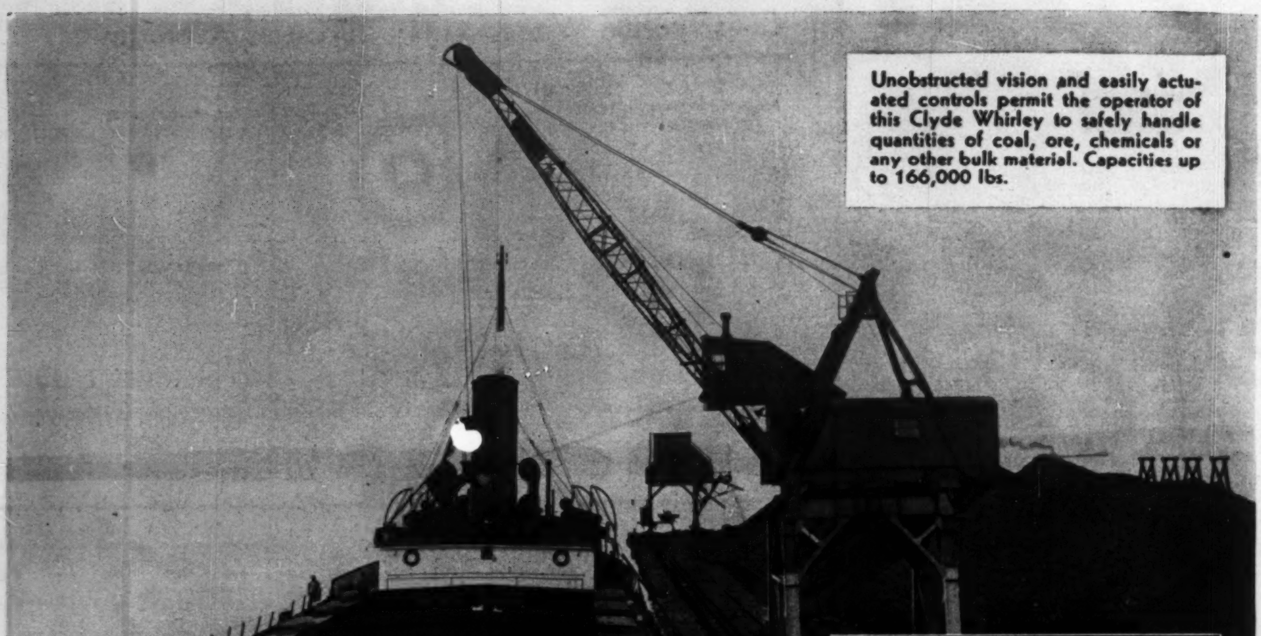
	1939#	1945#	1949#	1950#	1952#	1953*	1954*	1955*
Jan	59.6	76.1	102.7	100.6	113.1	113.9	115.2	114.3
Feb	59.4	76.0	101.6	100.4	112.4	113.4	115.0	114.3
Mar	59.3	76.0	101.9	100.7	112.4	113.6	114.8	114.3
Apr	59.2	76.1	102.1	100.8	112.9	113.7	114.6	114.2
May	59.1	76.7	101.8	101.3	113.0	114.0	115.0	114.2
Jun	59.0	77.3	102.0	101.8	113.4	114.5	115.1	114.4
Jul	59.2	77.5	101.4	102.9	114.1	114.7	115.2	114.7
Aug	59.0	77.5	101.6	103.7	114.3	115.0	115.0	.....
Sept	60.2	77.2	102.1	104.4	114.1	115.2	114.7	.....
Oct	60.0	77.2	101.5	105.0	114.2	115.4	114.5	.....
Nov	59.9	77.5	101.6	105.5	114.3	115.0	114.6	.....
Dec	59.6	77.8	101.0	106.9	114.1	114.9	114.3	.....

Pre-depr. high; 77.0, Nov 1925—Depr. low; 53.6, Apr 1933.
*** For details of latest revision see the February '53 Monthly Labor Review.**
# Interim adjusted series converted from 1935=39=100 1947=49=100 base.

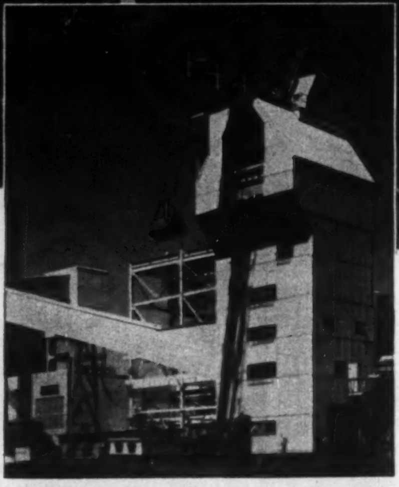
Construction Wages and Benefits

The wages reported monthly by ENR include take-home pay plus fringe benefits. During the first nine months of 1955, the ENR 20-Cities average wage rates showed common laborers coming up with less of an increase on the average than in '54. This year, the average increased by 6.8 cents per hour, compared with an 8.0 cents average raise during the same period of 1954. In contrast, skilled workers came up with the same increase on the average this year as last. The 20-Cities average for the three key skilled trades—bricklayers, carpenters and structural ironworkers—rose by 8.7 cents per hour, equal to the average increase during the first nine months of 1954.

Construction workers real wages rose in line with actual wage increases as living costs remained stable for the second consecutive year. In fact, the BLS Consumer Price Index in July '55 was the same as in July '53. However, the Consumer Price Index shows signs of starting to creep upward.

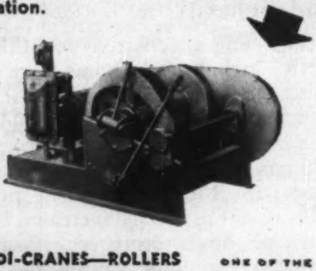


Unobstructed vision and easily actuated controls permit the operator of this Clyde Whirley to safely handle quantities of coal, ore, chemicals or any other bulk material. Capacities up to 166,000 lbs.



"Fleet-Block Reeving", a patented Clyde feature, provides faster horizontal bucket travel as trolley traverses in or out on the boom. Clyde Unloaders are available in capacities up to 1200 tons per hour.

Clyde drum and capstan type car pullers and barge movers facilitate loading, unloading or re-handling operations at loading stations. Units are safety engineered and quality constructed to give long-life, trouble-free operation.



On the go or on the spot . . .
Clydes cut handling costs

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DESIGNED FOR SAFER, MORE EFFICIENT SERVICE!

Self-propelled Clyde Whirleys and Clyde Unloaders give a flexibility of operation and a handling capacity ordinarily associated with a multi-unit installation. Anti-friction bearings throughout, the latest improved system of controls combined with many other Clyde features provide the most economical and dependable machines for high production duty. That's why owners and operators around the world 'take pride in their Clyde' . . . a pride justified by many years of continuous, trouble-free, *safe* operation.

Whatever your requirements for the handling of bulk material, Clyde engineers offer their assistance in the profitable solution of your problems. And there's no obligation when you call on the more-than-half-century experience of Clyde!

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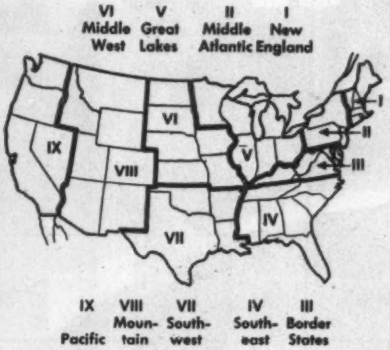
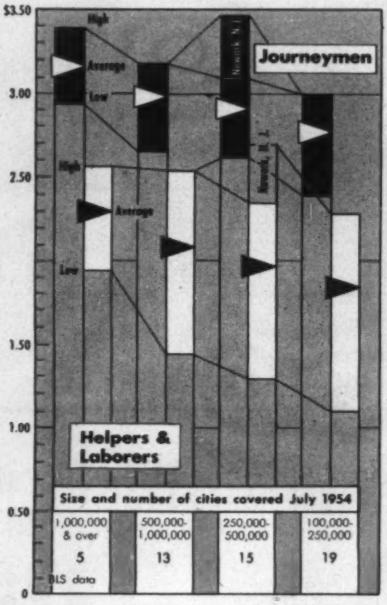
STEEL CORPORATION
WORKING IN
STEEL, ALUMINUM
MAGNESIUM, FIBERGLASS





Average Union Wages, Building Trades, by Area

Bureau of Labor Statistics, July 1, 1954

Trade	United States	I New England	II Middle Atlantic	III Border States	IV South-east	V Great Lakes	VI Middle West	VII South-west	VIII Moun-tain	IX Pacific
All building trades	$2.80	$2.60	$3.05	$2.63	$2.30	$2.92	$2.78	$2.50	$2.54	$2.75
Journeymen	2.99	2.82	3.27	2.90	2.64	3.05	2.93	2.75	2.76	2.87
Asbestos workers	3.07	2.89	3.28	2.99	2.74	3.13	3.01	2.98	2.85	3.07
Boilermakers	3.11	3.00	3.44	3.01	2.90	3.13	2.96	2.90	3.01	3.05
Bricklayers	3.39	3.10	3.69	3.31	3.06	3.29	3.45	3.36	3.22	3.28
Carpenters	2.90	2.66	3.26	2.80	2.44	3.01	2.86	2.55	2.71	2.75
Cement finishers	2.87	3.01	3.24	2.63	2.35	2.94	2.92	2.53	2.67	2.71
Electricians (inside wiremen)	3.09	2.90	3.30	3.05	2.85	3.14	3.06	2.97	2.89	3.05
Elevator constructors	3.12	2.99	3.35	3.09	2.86	3.11	3.02	2.98	2.96	3.10
Glaziers	2.67	2.50	2.98	2.61	2.15	2.86	2.79	2.28	2.30	2.49
Lathers	3.22	3.05	3.30	3.14	2.71	3.18	3.00	3.16	3.11	3.33
Machinists	3.07	2.75	3.33	3.00	2.50	3.06	2.99	2.91	2.78	2.90
Marble setters	3.06	2.95	3.18	3.16	2.94	3.12	3.02	2.83	2.80	2.96
Mosaic and terrazzo workers	3.01	2.93	3.24	2.97	2.96	2.98	3.13	2.66	3.09	2.95
Painters	2.77	2.48	2.85	2.54	2.37	2.90	2.72	2.50	2.53	2.78
Paperhangers	2.73	2.61	2.61	2.28	2.48	2.89	2.66	2.38	2.51	2.78
Plasterers	3.27	3.12	3.52	3.17	2.65	3.21	3.13	3.09	3.15	3.36
Plumbers	3.12	2.95	3.39	2.96	2.90	3.11	3.01	2.92	2.93	3.15
Rodmen	2.90	3.18	3.31	2.79	2.47	3.03	2.87	2.60	2.74	2.69
Roofers, composition	2.76	2.76	3.09	2.32	2.01	2.90	2.68	2.24	2.75	2.72
Roofers, slale and tile	2.82	3.01	3.03	2.91	2.18	3.02	2.64	2.43	2.51	2.77
Sheet-metal workers	2.96	2.86	3.25	2.84	2.57	3.00	3.05	2.74	2.66	2.91
Steam and sprinkler fitters	3.11	2.91	3.37	2.93	2.91	3.15	3.08	2.98	2.97	3.13
Stonemasons	3.25	3.10	3.27	3.27	3.14	3.21	3.36	3.38	3.30	3.23
Structural iron workers	3.08	3.21	3.33	3.10	2.68	3.15	2.92	2.84	2.78	2.90
Tile layers	3.05	3.02	3.25	2.98	2.80	3.06	2.95	2.71	2.81	3.04
Helpers and laborers	2.05	1.99	2.28	1.72	1.37	2.26	2.10	1.47	1.97	2.18
Bricklayers' tenders	2.22	1.99	2.45	1.68	1.29	2.30	2.20	1.53	2.25	2.50
Building laborers	1.96	1.97	2.15	1.70	1.38	2.22	2.03	1.40	1.85	2.09
Composition roofers' helpers	1.89	2.00	1.96	1.75	1.35	2.02	1.95	1.48	....	2.00
Elevator constructors' helpers	2.23	2.10	2.46	2.18	2.00	2.17	2.16	2.12	2.09	2.17
Marble setters' helpers	2.22	2.10	2.29	2.17	1.35	2.43	2.06	1.63	2.05	2.26
Plasterers' laborers	2.30	2.14	2.51	1.88	1.43	2.40	2.42	1.69	2.28	2.95
Plumbers' laborers	2.09	....	2.23	1.74	1.27	2.39	2.27	1.55	2.09	2.19
Terrazzo workers' helpers	2.39	2.12	2.60	1.99	1.35	2.44	2.27	1.58	1.96	2.41
Tile layers' helpers	2.33	2.12	2.56	2.18	1.35	2.37	2.08	1.58	2.05	2.26

Average Hourly* Earnings on Contract Construction

Bureau of Labor Statistics, dollars per hour

	Building*						Non building*						Manufacturing					
	1946	1949	1950	1953	1954	1955	1946	1949	1950	1953	1954	1955	1946	1949	1950	1953	1954	1955
Jan	$1.40	$1.92	$1.98	$2.41	$2.58	$2.65	$1.30	$1.71	$1.75	$2.18	$2.33	$2.31	$1.00	$1.41	$1.42	$1.74	$1.80	$1.84
Feb	1.42	1.93	1.99	2.42	2.59	2.65	1.30	1.71	1.77	2.19	2.29	2.33	1.00	1.40	1.42	1.74	1.80	1.85
Mar	1.41	1.93	2.00	2.44	2.59	2.63	1.28	1.70	1.77	2.29	2.27	2.31	1.04	1.40	1.42	1.75	1.79	1.85
Apr	1.42	1.93	1.99	2.44	2.58	2.63	1.31	1.71	1.75	2.18	2.28	2.34	1.06	1.40	1.43	1.75	1.80	1.86
May	1.43	1.93	2.00	2.44	2.58	2.63	1.31	1.71	1.76	2.19	2.32	2.34	1.07	1.40	1.44	1.76	1.81	1.87
June	1.44	1.92	2.00	2.44	2.58	2.64	1.31	1.70	1.76	2.19	2.31	2.34	1.08	1.41	1.45	1.77	1.81	1.87
July	1.47	1.92	2.01	2.47	2.58	....	1.36	1.71	1.78	2.22	2.31	....	1.09	1.41	1.46	1.77	1.80	1.88
Aug	1.48	1.93	2.02	2.49	2.60	....	1.35	1.71	1.79	2.26	2.32	....	1.11	1.40	1.46	1.77	1.79	....
Sept	1.51	1.94	2.07	2.52	2.62	....	1.37	1.73	1.83	2.28	2.33	....	1.13	1.41	1.48	1.79	1.81	....
Oct	1.53	1.94	2.08	2.54	2.63	....	1.40	1.74	1.83	2.31	2.33	....	1.14	1.39	1.50	1.79	1.81	....
Nov	1.55	1.95	2.09	2.55	2.63	....	1.43	1.75	1.84	2.31	2.34	....	1.15	1.39	1.51	1.79	1.83	....
Dec	1.57	1.96	2.12	2.57	2.65	....	1.43	1.78	1.88	2.30	2.33	....	1.16	1.41	1.54	1.80	1.83	....

* Series revised March, 1948 to cover both public and private contract construction and to include workers engaged in off-site operations for construction as well as site workers.

Work Injuries Drop

The construction industry cut work injuries by 9% in 1954. The total number of disabling injuries declined to 205,000 in 1954, as estimated by the Department of Labor, fewest since 1950. This compares with a record 230,000 injuries in 1951 and 1953's near-record of 225,000.

Latest figures for the frequency rate of work injuries show that construction reduced its rate in 1953 to 32.9 per million man-hours worked from 35.3 in 1952. The '54 rate was well below the 41.0 in 1950.

$ per week & hours worked

	1954		Apr. 1955	
	Earn/wk	Hrs/wk	Earn/wk	Hrs/wk
All contr constr	$93.98	37.0	$92.26	35.9
Building	94.12	36.2	93.10	35.4
General	89.41	36.2	87.15	35.0
Spec trade	98.01	36.3	97.10	35.7
Plumb & heat	102.71	37.9	102.85	37.4
Paint & decor	90.39	34.5	90.51	33.9
Electrical	112.71	38.6	112.81	38.5
Other	93.19	35.3	92.92	34.8
Non-building	92.86	40.2	89.15	38.1
Highway & street	86.88	40.6	81.53	38.1
Other	97.36	39.9	95.25	38.1

Average hourly earnings on contract construction increased at a slower pace in '55 than in recent years. BLS figures for July '55 show workers on building construction averaged $2.64 per hour, six cents more than in July '54. This compares with a 14-cent increase between July '53 and July '54. On nonbuilding construction, July '55 earnings averaged $2.34 per hour, three cents over a year ago. This was much less than the 12-cent gain between July '53 and July '54.

Work Injury Rates in Construction, 1952–1953

Bureau of Labor Statistics

	Number estabs reporting	Injury frequency[a] 1953	Injury frequency[a] 1952	1953 severity[b] rate	Aver days lost[d]	1953 Injuries resulting in Perm total[c] %	1953 Injuries resulting in Perm partial %	1953 Injuries resulting in Temp total %
Contract construction	4,686	32.9	35.3*	3.2	107	1.0	2.4	96.6
General building contractors	1,567	37.2	38.1	3.0	80	0.6	2.3	97.1
Heavy construction	284	31.2	29.8*	4.0	130	1.3	3.6	95.1
Highway & street	496	38.5	46.0	4.7	123	1.2	2.4	96.4
Special-trade contractors	2,339	27.8	31.4*	2.6	116	1.3	1.6	97.1
Plumb, heat, air cond	608	25.6	31.3	1.9	75	0.7	1.8	97.5
Painting & decorating	314	23.0	23.6	...	...	...	...	....
Electrical	322	23.6	30.6	1.9	80	1.0	0.2	98.8
Masonry, stonework, tile setting & plastering	335	30.9	31.7	2.0	65	0.5	1.0	98.5
Roofing & sheet-metal	207	35.1	38.0	3.9	109	1.4	0.3	98.3
Structural steel erection	50	44.8	46.9	8.9	267	3.1	2.8	94.1
Misc. spec-trade contractors	503	32.3	35.3*	4.5	132	1.6	2.3	96.1

*a average number of disabling work injuries per million employee-hours worked *b average number of days lost for each 1,000 employee-hours worked *c permanent, including death *d charged to each case ** revised

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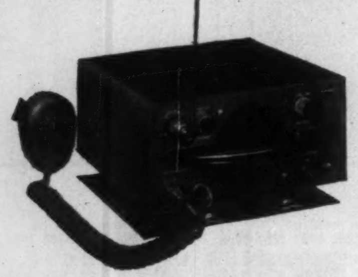

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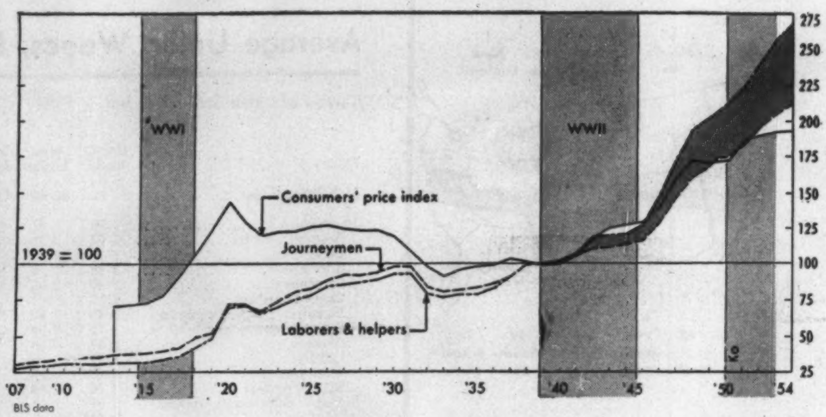
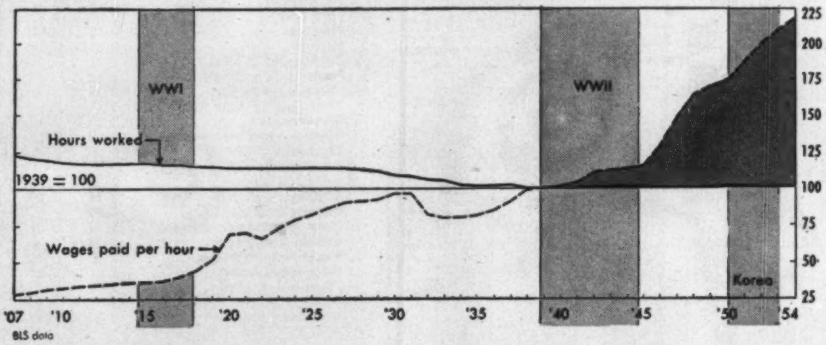


BLS data



BLS data

Union Labor Trends, US Bu of Labor Statistics

Wage rates per hour—Index, 1939 = 100

Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians Inside Wiring	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkl Fitrs	Stonemasons	Structural Ironworkers	Building Laborers	Bricklayers' Tenders
1907M...	29.3	29.7	27.3	37.7	29.8	34.5	27.9	....	....	26.2	37.3	33.3	30.6	30.1	33.9	27.9	30.8	30.3
1913M...	36.1	36.9	31.8	41.5	36.8	38.0	33.8	....	34.6	35.5	39.3	37.9	35.6	35.0	36.7	37.3	34.2	31.8
1926M...	88.3	88.7	84.9	94.1	88.5	86.6	81.5	80.7	83.0	90.9	92.4	83.9	86.3	84.9	92.7	81.1	86.9	85.5
1930M...	97.0	97.5	93.3	101.8	96.9	95.4	90.9	92.6	89.6	100.6	98.1	91.5	94.7	93.5	99.1	92.5	92.9	94.9
1932M...	83.1	83.6	79.2	87.0	79.6	83.6	87.9	78.0	80.0	85.3	81.4	80.5	83.4	81.0	88.4	81.0	78.7	78.4
1938J....	99.3	99.3	99.2	99.5	99.8	99.6	99.5	99.3	96.8	99.2	99.2	99.1	98.6	99.3	99.7	98.9	99.4	99.7
1942.....	111.9	110.9	117.5	108.3	112.1	110.8	113.5	108.8	109.1	110.5	105.0	110.5	116.0	109.3	108.0	108.7	119.6	115.7
1946.....	129.3	126.8	146.3	125.6	129.7	128.2	124.9	123.4	124.2	127.3	119.0	123.2	133.0	124.6	126.5	121.4	152.2	141.7
1948.....	163.5	159.4	192.7	165.6	164.7	161.1	154.4	155.5	157.8	154.4	148.2	158.2	164.4	154.3	166.0	151.9	200.8	185.5
1949.....	170.3	166.1	199.8	174.0	169.1	165.8	168.1	160.5	164.2	162.1	161.9	162.8	169.6	161.3	175.7	157.4	208.4	190.4
1950.....	177.8	173.2	210.8	180.4	177.4	172.7	172.3	169.4	179.6	167.7	169.3	166.7	177.9	168.3	187.1	164.8	220.0	203.4
1951.....	189.1	184.0	225.3	188.0	189.1	183.7	185.4	177.8	188.0	178.7	177.5	176.6	188.1	178.6	193.6	175.7	235.6	213.9
1952.....	200.8	195.3	240.0	203.9	200.6	192.2	196.0	186.0	194.4	190.2	187.6	187.0	202.2	189.1	207.5	184.0	251.7	228.0
1953.....	211.2	204.9	256.6	210.0	211.1	203.8	204.0	199.1	203.4	199.5	194.8	193.8	211.5	197.9	210.9	194.5	270.8	240.0
1954.....	218.9	212.2	267.7	216.8	217.9	209.7	210.0	204.9	208.7	205.7	198.4	204.5	221.5	208.5	215.7	201.3	282.6	250.4

Hours worked per week—Index, 1939 = 100

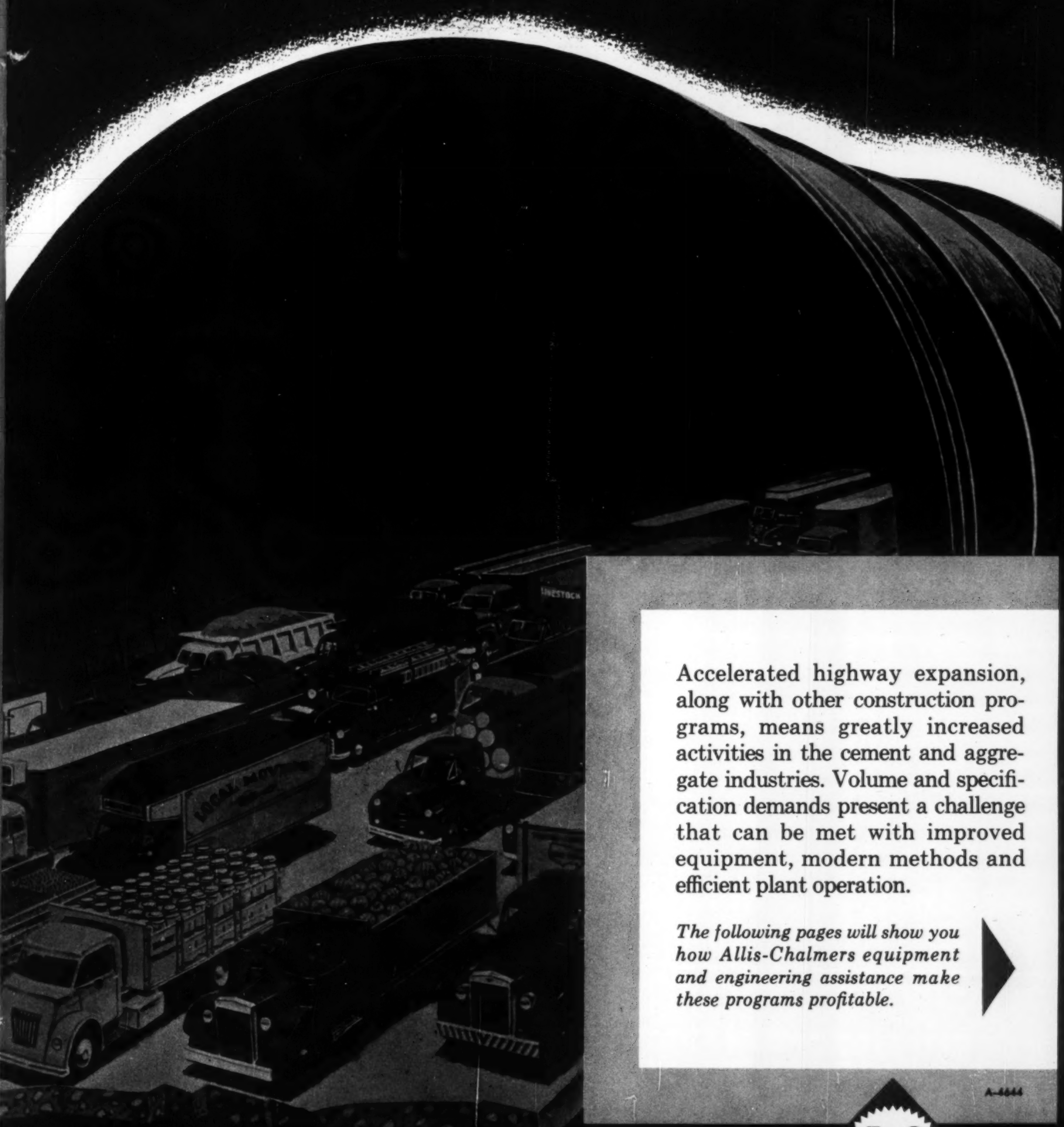
Year	All Building Trades	Journeymen	Helpers & Laborers	Bricklayers	Carpenters	Cement Finishers	Electricians Inside Wiring	Glaziers	Lathers	Painters	Plasterers	Plumbers & Gas Fitters	Sheet Metal Workers	Steam & Sprinkl Fitrs	Stonemasons	Structural Ironworkers	Building Laborers	Bricklayers' Tenders
1907M...	124.3	123.8	126.1	122.9	121.0	122.7	124.2	....	....	133.1	125.8	120.6	117.0	120.3	118.4	121.3	121.6	118.9
1913M...	118.2	118.0	118.3	114.9	115.6	119.8	120.7	....	121.8	125.9	124.3	119.2	114.9	118.0	115.7	114.1	118.3	116.0
1926M...	114.9	115.1	113.9	113.3	113.5	113.4	115.9	117.5	118.9	120.7	118.2	116.5	111.8	114.4	114.5	112.8	112.1	113.9
1930M...	109.8	110.0	109.0	107.1	109.4	108.1	109.9	112.4	110.4	115.4	113.0	109.9	106.9	108.5	107.1	108.8	110.0	106.9
1932M...	106.5	106.6	105.7	103.1	105.0	105.6	106.2	107.9	109.3	114.2	110.1	108.0	103.6	106.4	104.8	104.8	104.9	104.0
1938J....	100.2	100.1	100.2	99.0	100.0	100.0	100.2	100.2	100.8	110.4	100.0	99.7	100.0	99.6	100.1	100.1	100.1	100.3
1942.....	101.1	101.8	98.8	100.8	100.8	100.6	104.5	102.0	102.5	106.5	102.0	99.9	100.9	102.2	100.2	101.1	98.8	98.6
1946.....	100.2	101.1	97.5	100.3	103.3	100.4	100.4	102.0	102.2	106.1	104.1	98.3	100.8	101.3	100.0	101.1	97.2	96.9
1948.....	100.1	101.0	97.4	100.5	100.2	100.0	100.4	103.5	98.1	106.2	102.9	97.6	100.1	101.3	101.0	101.1	97.2	96.4
1949.....	100.2	101.1	97.4	100.1	100.2	100.0	102.1	103.5	98.1	106.2	103.5	97.6	99.9	101.3	100.8	101.1	97.2	96.4
1950.....	100.3	101.2	97.4	100.1	100.2	100.0	102.1	103.5	100.2	106.2	105.9	98.2	99.9	101.3	100.8	101.1	97.2	96.4
1951.....	100.2	101.1	97.3	100.2	100.2	100.0	102.1	103.5	100.2	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.0	96.2
1952.....	100.2	101.1	97.5	100.2	100.2	100.0	101.1	103.5	100.2	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3
1953.....	100.2	101.1	97.5	101.2	100.2	100.0	101.1	103.5	100.3	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3
1954.....	100.2	101.1	97.5	100.2	100.2	100.0	101.1	103.5	99.8	104.9	105.9	98.2	99.9	101.3	100.9	101.1	97.1	96.3

• M May 1. • J June 1. • All others July 1.

Average wage rate increase in 85 cities—January to July

	Per cent				Cents per hour				Rates, July 1, 1954			Rates, July 1, 1955		
	1Q		2Q		1Q		2Q		Low	Aver	High	Low	Aver	High
Trade	'54	'55	'54	'55	'54	'55	'54	'55						
Bricklayers......	0.2	0.3	2.3	1.3	0.7	1.0	7.6	4.5	$2.50	$3.39	$3.80	$2.50	$3.47	$3.85
Carpenters......	0.2	0.1	1.3	2.4	0.5	0.2	3.8	6.9	2.10	2.89	3.50	2.18	3.01	3.55
Electricians.....	0.3	0.1	1.5	1.1	0.8	0.4	4.6	3.4	2.45	3.09	3.50	2.60	3.17	3.65
Painters........	0.9	0.1	1.2	2.2	2.4	0.2	3.4	6.1	1.75	2.77	3.13	1.75	2.87	3.25
Plasterers.......	0.1	0.2	0.9	1.8	0.3	0.5	2.9	5.9	2.25	3.27	3.75	2.25	3.36	3.85
Plumbers.......	0.1	0.1	2.0	1.2	0.4	0.3	6.1	3.9	2.50	3.12	3.50	2.63	3.19	3.50
Bldg laborers....	0.4	0.3	2.3	3.1	0.8	0.6	4.4	6.0	0.90	1.94	2.70	0.90	2.04	2.80

WANTED — More Cement ...More Aggregates



Accelerated highway expansion, along with other construction programs, means greatly increased activities in the cement and aggregate industries. Volume and specification demands present a challenge that can be met with improved equipment, modern methods and efficient plant operation.

The following pages will show you how Allis-Chalmers equipment and engineering assistance make these programs profitable. ▶

A-4644

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Milwaukee 1, Wisconsin

How ALLIS-CHALMERS Helps

ENGINEERING HELP for plant operators and consultants

Ahead of you lie what could be your most profitable years. Is your plant ready to handle the volume? Is your plant geared to meet rigid specifications, economically? The best way of finding out is to get in touch with Allis-Chalmers for an expert evaluation of your present processing operations.

Why Allis-Chalmers? — No other company builds as many types and sizes of integrated processing machinery, power generation and utilization equipment. In examining your problems, Allis-Chalmers is not only concerned with correct application of machinery but with overall plant efficiency . . . ways and means of making existing as well as new equipment "team up" to produce maximum volumes of desired products at lowest cost.

Valuable Assistance for You or Your Consultant — Flow and plant design, pre-recommendation research and pilot plant testing, expert installation and service are all available from Allis-Chalmers, a company with over a century of experience in designing, building and applying processing machinery.

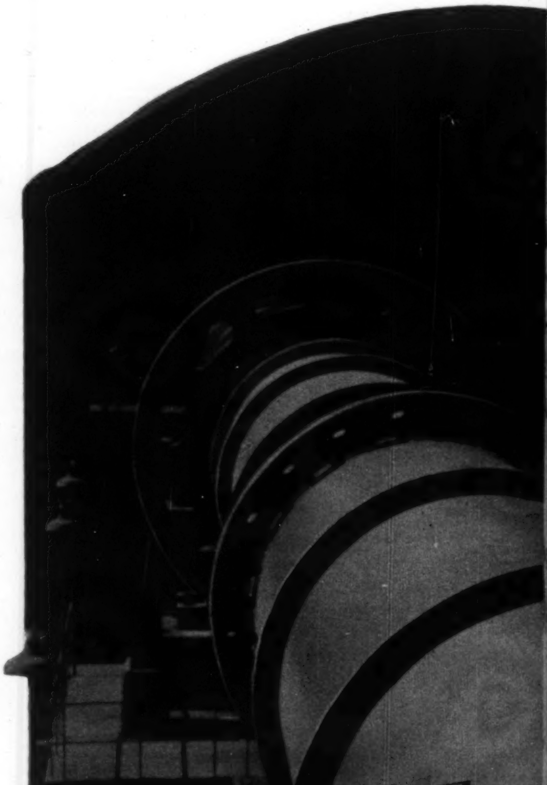
Unbiased Recommendations — Whether you operate a small pit or a complicated production system, the facilities and experience of Allis-Chalmers are at your disposal. And Allis-Chalmers broad scope of integrated equipment permits making unbiased recommendations, dictated entirely by your specific needs.

Service Everywhere . . . At All Times — Allis-Chalmers interest in your problems does not end with the installation of equipment. Laboratory facilities, periodic check-up, maintenance and fast emergency parts service are yours continuously through your nearby Allis-Chalmers representative.

Allis-Chalmers Rotary Kilns for Cement and Lightweight Aggregate Production

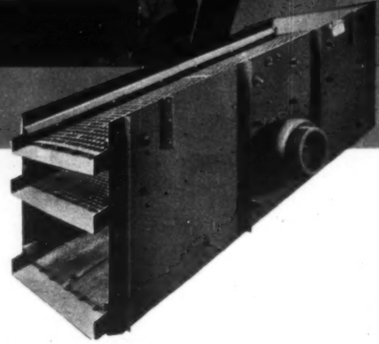
Cement operators have long acknowledged the superiority of Allis-Chalmers rotary kilns—superiority that is reflected in long-term dependability as well as low-cost operation and maintenance.

Efficient kiln design is a result of Allis-



Hydraulically Adjusted Crushers Afford One-Man, One-Minute Product Control

Most Allis-Chalmers gyratory crushers are supplied with hydraulic adjustment which provides precise product size control by the flick of a finger. Compensation for wear and emergency unloading are controlled in the same manner. Other Allis-Chalmers crushers include a broad range of jaw crushers, roll crushers, and multi-impact hammermills.



Vibrating Screens for Every Application

Allis-Chalmers builds a complete line of vibrating screens, including units for scalping, medium and fine separation, wet or dry screening, rinsing and dewatering.

Cement and Aggregate Plants

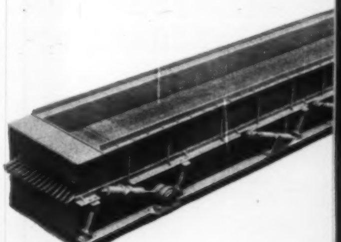
★ Increase Volume
★ Meet Specifications

Chalmers specialized engineering and the experience gained in building and applying hundreds of kilns in the last 50 years.

Allis-Chalmers all-welded rotary kilns are built in standard and special sizes for a wide variety of uses, including cement manufacturing and the production of lightweight aggregates, lime, refractory materials, fertilizers and chemicals.

Air-Cooled Kiln End Keeps Nose Brick in Place

There's no end warpage on kilns equipped with this air-cooled end. Cooling air circulating around discharge end along underside of nose casting keeps kiln end cool, prevents distortion. Production loss is greatly minimized and unit pays for itself in two or three years in refractory savings alone. Saves fuel, too, by maintaining positive air seal between firing hood and kiln. Can be installed on any make of kiln.

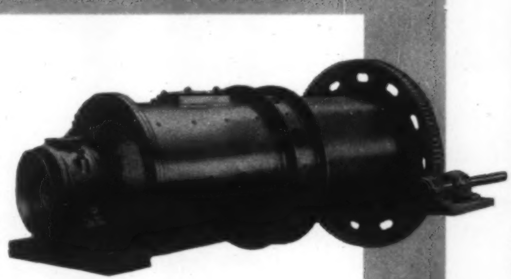


Air-Quenching Cooler for Better Products at Lower Cost

Improves grindability of cement clinker by fast quenching. Saves cement kiln fuel by isolating and directing hottest air back to kiln. Lowers power costs. Simplified design minimizes maintenance.

Grinding Mills for Profitable Production of Specification Sand

Because of stringent specifications, decreasing natural sand reserves and local variations in sand and gravel, operators are "manufacturing" sand in Allis-Chalmers rod mills. These mills are simple to operate. Maintenance is low. Allis-Chalmers also manufactures many other types of mills used wherever finely ground materials are produced, including multi-compartment mills for grinding cement raw materials and clinker.

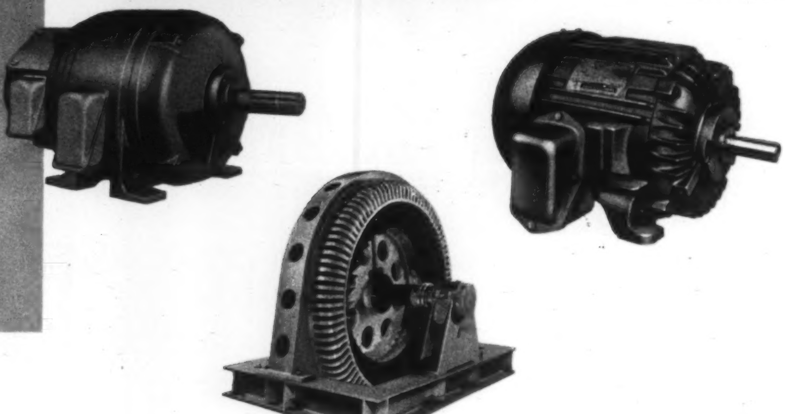


***In addition to processing machinery, Allis-Chalmers supplies the required**

ELECTRICAL EQUIPMENT

. . . machinery and equipment designed to work together, backed by undivided responsibility.

ALLIED ELECTRICAL EQUIPMENT



MOTORS — Allis-Chalmers builds a complete line of polyphase squirrel-cage and wound-rotor induction motors for every industrial use. These, as well as synchronous and direct current motors, are available with electrical and mechanical modifications to meet a wide variety of applications. Mechanical modifications obtainable include drip-proof, splash-proof and totally-enclosed fan-cooled construction in vertical as well as horizontal types. Many ratings are available with flange-type construction.

Squirrel-Cage Motors — Most used of all motors is constant speed three-phase cage motor. Construction simplicity makes initial cost and maintenance low.

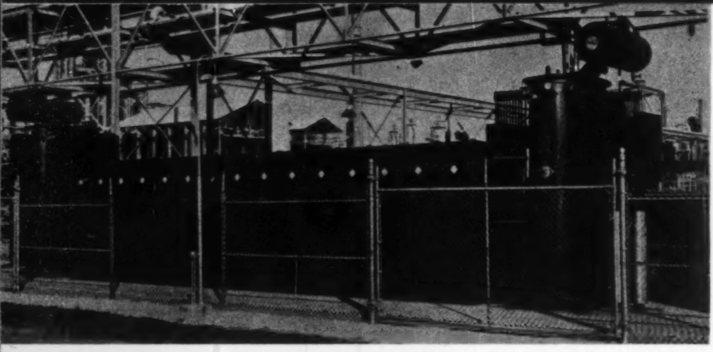
Wound-Rotor Motors — Used for constant speed duty requiring frequent reversing or starting under heavy load; high starting torque. Also suitable for adjustable-varying speed duty.

Synchronous Motors — Applicable to most constant speed drives. Operating characteristics include high efficiency and the ability to improve system power factor. Widely used for grinding mills, either through magnetic clutches or as direct-connected high torque motors.

Direct Current Motors — Occasionally used for adjustable-speed service, such as for kiln drives.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS



UNIT SUBSTATIONS

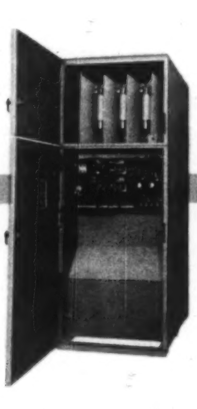
Switchgear is the key to power continuity. In the substation illustrated, double-ended switchgear is combined with duplicate Allis-Chalmers power transformers.

Allis-Chalmers switchgear offers the following advantages:

Saves Space — Compartments have been designed to permit adding special transfer bus or ring bus without adding cubicles.

Saves Cost — Elimination of duplicate facilities or extra cubicles cuts equipment cost.

Saves Time — Dry-type bus joint insulation simplifies adding or removing cubicles. There are no compounds to melt.



CONTROL

Allis-Chalmers can supply motor control for practically every application. Shown is the Type H Control for 2300-5000-volt motors. Starter is provided with air or oil contactor. Meters, relays, fuses, switches — everything needed for the complete protection of man, motor and machine is conveniently installed in an attractive, easy-to-install cubicle.

I would like bulletins on

....
(Type of equipment)

ALLIS-CHALMERS
Milwaukee 1, Wisconsin

Explanation of process or problem. ....

Name ....

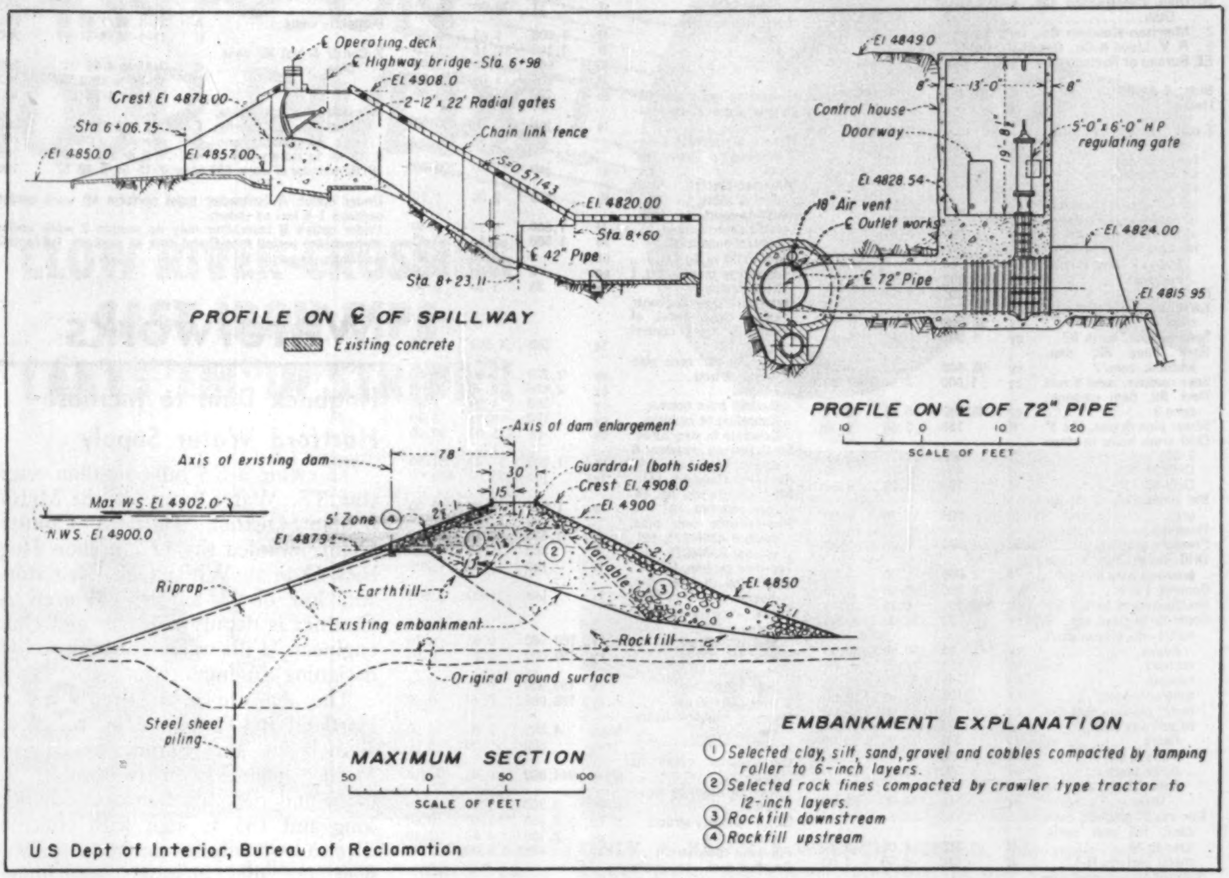
Title .... Company

Address ....

City .... Zone State

A-4644

Unit Prices Bid by Contractors


℄ Operating deck
℄ Highway bridge - Sta. 6+98
El. 4908.0
Crest El 4878.00
2-12' x 22' Radial gates
Sta 6+06.75
Chain link fence
El 4850.0
El 4857.00
S=0.57143
El. 4820.00
Sta. 8+60
℄ 42" Pipe
Sta. 8+23.11
El 4849.0
8"
13'-0"
8"
Control house
Doorway
5'-0" x 6'-0" HP regulating gate
19'-8"
El 4828.54
18" Air vent
℄ Outlet works
El. 4824.00
℄ 72" Pipe
El. 4815.95
10
0
10
20
SCALE OF FEET
Axis of dam enlargement
Axis of existing dam
78'
30'
Guardrail (both sides)
15
Crest El. 4908.0
Max W.S. El 4902.0
El. 4900
N.W.S. El 4900.0
5' Zone
④
2½:1
1:1
El 4879½
①
②
Variable
1:1
2:1
③
El. 4850
Riprap
Earthfill
3:1
Existing embankment
Rockfill
Original ground surface
Steel sheet piling
50
0
50
100
SCALE OF FEET

PROFILE ON ℄ OF SPILLWAY

▨ Existing concrete

PROFILE ON ℄ OF 72" PIPE

MAXIMUM SECTION

EMBANKMENT EXPLANATION

① Selected clay, silt, sand, gravel and cobbles compacted by tamping roller to 6-inch layers.
② Selected rock fines compacted by crawler type tractor to 12-inch layers.
③ Rockfill downstream
④ Rockfill upstream

U S Dept of Interior, Bureau of Reclamation

Enlarging Pineview Dam, Utah, with Reservoir in Operation

An exacting schedule of water lowerings, to permit spillway construction, modification of wells and a 72-in outlet pipe connection without interfering with irrigation and streamflow, dictates the scheduling of operations on raising the Pineview Dam to increase reservoir capacity by 60,000 ac ft to 110,000, as part of the Weber Basin Project, Ogden, Utah. Utah Construction Co. has a $1,372 million contract with the Bureau of Reclamation. L. N. McClellan is assistant commissioner and chief engineer, K. B. Keener is chief design engineer, Denver and Clinton D. Woods is projects manager in Ogden.

Electric power is available from Utah Power and Light Co., but the contractor must provide transmission lines, distribution circuits, transformers and other equipment needed to deliver power to where he needs it. The contractor must provide access to the job from existing roads and relocate about two and a quarter miles of existing highways. Removal of existing concrete for modification of spillway and outlet works and of some 2,000 feet of wood stave pipe, to make way for the 36-in concrete pipe for Ogden's city water supply line, precede construction operations. The main sections of the work to be done are shown with the contractor's performance time options at the end of the unit prices table.

All concrete is to be air entrained. The mix, by weight, can be varied by the engineer according to the results of tests. Concrete strength requirements vary from 3,500 to 6,000 psi at 28 days.

The government will furnish all lubricating oil and grease for the equipment to be installed, two 42" butterfly valves and steel pipe for their controls, sump pump and controls, piping, valves, fittings and metalwork for high-pressure gate controls, 42" line meter, radial gates, float-operated switches, ladders, handrails, platforms and metal covers, embedded metal work, most electrical apparatus, insulated wire and cable, cable supports, pull boxes for conduit system, wiring devices and lighting fixtures (Contractor furnishes materials and constructs and connects a self-supporting 220-volt aerial cable, a 115-volt aerial power cable, a 9-conductor aerial control cable and a 7-conductor aerial control cable from the crest of the dam to the valve control house.) Equipment and materials furnished by the government are delivered to the contractor fob cars, Ogden, Utah to be hauled 8 miles to the site of the work.

Minimum wage rates certified for this job include: carpenters $2.50 per hour, cement finishers $2.50, ironworkers either structural or reinforcing $2.80, laborers $1.775-2.15, tunnel laborers working underground $1.90-2.65, gunite men $1.90-2.50, truck drivers $1.825-2.35, tractor operators $2.225-2.50. A construction camp site area is available down stream.

All bids exceeded the engineer's estimate, the low by 20 percent and the high of six by over 50 percent. Bidders include:

Continued on following page

Pineview Dam, Utah

Continued from preceding page

1C	Utah Construction Co., Salt Lake City, Utah	$1,372,172
2	Morrison-Knudsen Co., Inc., Boise, Idaho	1,414,874
6	R. V. Lloyd & Co., Coachella, Calif	1,714,839
EE	Bureau of Reclamation, Ogden, Utah	1,143,766

Bids: 6-14-55 Items	Unit	Quantity	Unit Prices 1C	2
Excav of exist dam embank	cy	8,000	$0.65	$0.74
for grout cap	cy	30	43.00	14.00
on right abutment	cy	78,000	2.55	2.90
for structure	cy	3,100	4.40	5.50
for 42" pipe & contr hse	cy	1,250	0.70	2.50
in outlet-works tunnels	cy	50	78.00	50.00
stripping borrow pits	cy	6,500	0.30	0.65
in borrow area and transportation to dam embank	cy	65,000	0.55	0.60
Backfill	cy	850	0.30	0.60
Earth fill, dam embank zone 1	cy	50,000	0.50	0.30
Spec compac, earth fill	cy	1,000	5.50	3.00
Rock fines fill, dam embank, zone 2	cy	55,000	0.75	0.35
Spec compac, zone 2 mat	cy	1,000	3.80	1.30
Rock fill, dam embank, zone 3	cy	45,000	0.55	0.18
Sewer pipe drains, f&c 8"	lf	120	3.50	2.00
Drill grout holes in stage 0-30'	lf	500	2.75	3.00
Drill 30-60'	lf	400	2.75	3.20
Drill 60-110'	lf	400	3.25	3.50
Std black pipe & fit for grtg	lb	300	1.15	1.00
Hook-up to grout holes	ea	15	10.00	10.00
Pressure grouting	sack	1,300	2.20	2.00
Drill holes for anchor grouting bars ip	lf	2,000	1.60	1.00
Cement, f & h	bbl	9,300	6.00	5.40
Reinforcement bars, f & p	lb	340,000	0.15	0.13
Concrete in grout cap	cy	30	28.00	20.00
outlet-wks access shaft house	cy	55	150.00	130.00
anchors	cy	175	22.00	40.00
tunnels	cy	40	87.00	56.00
control houses	cy	105	100.00	112.00
in 42" pipeline cont hse	cy	45	100.00	95.00
in spillway crest	cy	3,830	$21.00	$22.00
floors	cy	535	30.00	25.00
walls & pier	cy	1,560	60.00	60.00
baffle blocks	cy	60	50.00	32.00
oper dock & hwy brdg	cy	58	105.00	80.00
Saw cut 2" grooves, exist conc, f&i met seals, spec tp M	lf	105	8.00	5.00
metal seals tp N-1	lf	220	6.50	4.00
Remov timber tunnel supports & lagging	ls	job	4,500	3,000
Wire mesh slope mat	sy	820	15.00	4.50
Saw cut, remov exist conc	lf	365	3.00	1.40
Remov exist concrete	ls	job	18,500	3,200
Support bolts, f&i	lf	150	5.00	3.00
Metal doors, f&i	sf	105	9.00	9.00
Roofing, f&p	sf	570	0.80	0.50
Steel outlet pipes, f&i	ls	job	25,800	49,000
Backfill select mats, in 42" outlet pipe trench	cy	243	7.00	3.50
Butterfly vlvs & contr, 42" i	lb	12,000	0.10	0.30
High-pres gates, transitions, hyd hoists & gate hangars	lb	101,000	0.035	0.13
Mov & reinstal high-pres gate controls & position indicators	ls	job	2,200	4,000
New high-pres gate controls & position indicators, i	ls	job	3,400	2,000
Line meter, 42" i	ls	job	240	800
New radial gates, i	lb	31,200	0.18	0.15
Remov & dispos exist radial gates & hoists	ls	job	1,400	3,000
Float well inlet piping, f&i	ls	job	500	800
Sump pump, float control, & discharge pipe, i	ls	job	350	500
Float-oper switches for radial gate control, i	ls	job	700	1,000
Handl, revis, f mats for, & reinstal 2 rad-gate hsts	ls	job	800	900
Excav & backfill, air vent main pipe extension	cy	90	2.80	6.00
Matls for air vent main extension & air vent cov, f&i	ls	job	$675.00	$1,500
Excav, backfill, compact bf of pits for well modifica, under 6' deep	ea	20	290.00	200.00
6'-8'	ea	10	360.00	250.00
8'-10'	ea	10	680.00	300.00
over 10'	ea	5	1,100	400.00
F&i matls for well connect modifications	ls	job	7,500	11,000
Embedded metalwork, i.	lb	1,125	0.44	0.50
Ladders, handrail, platforms, & met covers, i	lb	4,200	0.47	0.20
Chain link fence, f&i	lf	430	$3.50	$4.50
Modify exist spiral stairway	ls	job	400.00	600.00
Louvers, f&i	sf	31	22.00	20.00
Electr met conduit ¾" or less, f&i	lf	1,500	1.65	0.80
1"	lf	1,100	2.15	1.10
1" & ½"	lf	600	3.25	1.60
2"	lf	200	4.00	2.90
Grounding sys matls, f&i	lb	200	3.25	3.00
Remov exist electr systems	ls	job	850.00	450.00
Remov & reinstal gasoline-engine generator set	ls	job	1,230	700.00
Single-conductor, insul wire & cable, i	lb	250	2.00	1.70
Multiple-conductor, insulated control cable, i	lf	1,800	0.20	0.40
Electrical apparatus, i	lb	1,500	1.25	0.43
Stand-light tp ltg fixt, i	ea	4	45.00	45.00
Indust-type met ltg fixt, i	ea	8	9.00	11.00
Wiring devices, i	ea	25	2.20	5.00
Overhead pwr & contr cable circs, crest of dam to valve control house, f&i	ls	job	4,200	4,000
Excav, for 36" conc pipe line & structs	cy	2,200	2.00	1.50
Backfill	cy	2,400	2.80	0.50
Backfill from borrow	cy	250	4.00	1.50
Consolidg bf bedding	cy	190	5.50	2.50
Concrete in structures	cy	40	125.00	90.00
Steel sleeves, nozzles, & covers, f&i	lb	1,600	$1.40	$1.30
Air valve assembly, f&i	ls	job	580.00	900.00
Misc metalwork, for 36" conc pipe line, f&i	lb	1,000	0.98	0.60
Non-cylinder conc pipe, symbol A36NC75, f&i	lf	1,620	26.50	25.00
symbol B36NC75, f&i	lf	300	28.50	25.00
Tee-pipe section, f&i	ls	job	1,700	1,300
Steel pipe diversn sect, diversn & care of flow	ls	job	2,500	2,000
Excav roadway, Eden Hwy, first 100,000 cy	cy	100,000	0.52	0.70
over 100,000 cy	cy	100,000	0.51	0.60
Huntsville Hwy, first 150,000 cy	cy	150,000	0.41	0.70
over 150,000 cy	cy	153,000	0.40	0.60
Roadway embank watering	Mgal	4,860	2.00	1.00
rolling	rhrs	800	10.00	8.00
Overhaul of excav for rdwy	stacy	944,000	0.03	0.015
Excav for roadway structures	cy	6,900	1.60	1.50
Bf for roadway structs	cy	2,150	2.60	0.60
Compacting	cy	2,150	4.50	2.40
Fill exist rdwy struct	cy	600	9.00	3.00
Crushed-rock or gravel blanket under roadway riprap	cy	680	6.00	2.50
Riprap for roadway	cy	2,050	1.60	3.00
Remov conc, exist rdwy struct	cy	8	32.00	10.00
Remov exist 18" φ CMP culv	lf	264	2.50	1.50
30" φ	lf	110	3.00	2.50
60" φ	lf	10	10.00	6.00
Remov exist guardrail & guideposts	ls	job	1,000	3,000
Remov & salv chlor plant	ls	job	850.00	1,300
CM Pipe, No. 16 ga, 18" f&i	lf	8	5.00	4.50
No 14 ga, 24" f&i	lf	797	7.00	6.00
No 14 ga, 30" f&i	lf	126	9.00	8.00
No 10 ga, 60" f&i	lf	135	31.00	29.00
Multiple-plate, CMP with paved invert, 156" φ No 1 ga, f&e	lf	196	170.00	155.00
CM embankment protectors, No 14 ga, 24" φ, f&p	lf	206	8.50	6.50
Anchors for embankment protectors, f&i	ea	10	28.00	17.00
Cast-iron pipe, 16" φ, f&i	lf	275	15.00	19.00
Beam-type guardrail, f&e	lf	4,314	4.50	3.50
Guideposts, f&s	ea	158	8.00	11.00
Conc rdw drainage structs	cy	87	80.00	82.00
Crusher-run subbase	t	18,000	1.08	1.90
Crusher-run base	t	7,000	1.15	2.10
Liquid asph prime coat	t	70	42.00	45.00
Min aggr, bitum surf	t	5,000	1.22	2.20
Liquid asph, bitum surf	t	240	42.00	45.00
Stone chips for seal coat	t	460	6.50	4.00
Liquid asph for seal coat	t	38	44.00	45.00

*f furnish
*e erect
*i install
*c construct
*h handle
*l lay
*ip in place
*p place
*s set
*bf backfill

Performance schedule & liquidated damages

Section of work	Option	Time Allowed	LDam /Day
1 Spillway constr, upstream	A	7-15-55/2-29-56	none
	B	7-1-56/2-28-57	none
2 downstream	A	7-15-55/2-29-56	none
	B	7-1-56/2-28-57	none
3 Install radial gates	A	1-1 to 4-30 '56	$100
	B	7-1-56/4-30-57	100
4 Place embank matl in dam	A	7-15-55/3-31-56	none
	B	7-15-55/3-31-57	none
5 Install 72" outlet branch	A	3-24 to 3-31 '56	$400
	B	same '57	400
6 Modify wells	A	11-1-55/1-31-56	200
	B	11-1-56/1-31-57	200
7 Constr & test 36" conc pipe	C	3-15 to 4-25 '56	100
	D	10-20 to 12-1 '56	100
	E	3-15 to 4-25 '57	100
8 Install 60" stl pipe, gate, 42" stl pipe & butterfly valve & related conc	F	2-1 to 3-20 '56	200
	G	same '57	200
9 All wk to store water in res		1, 2, or 3 to 5-15-57	200
10 Remainder of work, 800 days		7-15-55/9-30-57	100

Under option A contractor must perform all work under sections 1-6 incl as shown.
Under option B contractor may do section 2 work under performance period A or B and rest of sections 1-6 under performance period B

Waterworks

Hogback Dam to Increase Hartford Water Supply

To create a 6.5 billion gallon reservoir, The Water Bureau of the Metropolitan District, Hartford County, Conn. awarded the $4.2 million Hogback Dam to White Oak Excavators, Inc, low of 11 bidders. Warren A. Gontner is deputy manager and chief engineer. William Dorenbaum is chief designing engineer.

The damsite is in the towns of Hartland and Colebrook on the West Branch of the Farmington River. Work includes construction of an earth and rock fill dam about 800 ft long and 135 ft high with concrete diversion conduit, concrete spillway weir and rock channel, gate house, tunnel heading, two miles of road and other related structures.

The District furnishes sluice gates, Diesel engine-generator set and bronze seal and plaque. All other materials and equipment are to be furnished by the contractor.

Work is accessible by highway and is six miles from the railhead.

Bidders include:

1C	White Oak Excavators, Inc., Plainville, Conn.	$4,223,464
2	Peter W. Kero, Inc., Carlstadt, N. J.	4,252,537
11	Yonkers Contracting Co., Inc., Yonkers, N. Y.	5,788,863
EE	Metropolitan Dist., Hartford County, Conn.	5,614,756

Time schedule: work started immediately after award of contract and must be completed by May 1, 1958.
Liquidated damages are $500 per calendar day.

Bids: 7-6-55 Items	Unit	Quantity	Unit Prices 1C	2
Clear and grub	acre	45	$750	$300
Stream control	ls	job	75,000	67,500
Rem suspension bridge	ls	job	1,000	500
Excavation, earth	cy	185,000	0.65	0.65
Rock	cy	440,000	2.30	1.90
Rock for tunnel head	cy	2,050	25.00	45.00
Rock fill	cy	175,000	0.60	0.25
mixed with earth	cy	19,000	1.00	0.25
Riprap, light	cy	17,000	5.00	4.00
heavy	cy	12,000	4.00	0.50
Earth fill	cy	53,000	0.50	0.20
Soil core	cy	89,000	1.25	1.00
Coarse gravel, 1/4"-4"	cy	21,000	2.00	2.00
1/4"-2"	cy	11,000	2.10	2.00
Sandy gravel, 4" max	cy	175,000	1.35	2.00
2" max	cy	8,500	1.75	2.00
Sand with little grav	cy	78,000	1.15	1.50
Topsoil, dressg & seed	cy	10,250	2.10	2.50
Seeding & mulch	sy	31,000	0.12	0.25
Drill holes rock & mas for grout & drains	lf	12,500	2.00	3.00
for anchors	lf	7,500	3.00	3.00

Continued on following page

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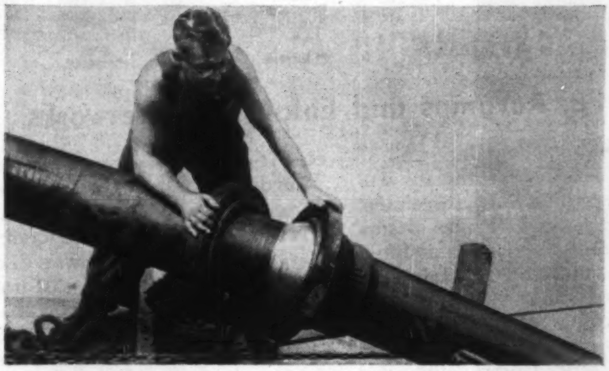

EASY TO LAY. As easy to make up as a standard flanged joint. Lower labor installation cost because of ease of joint make-up and longer laying lengths.

ONLY A RATCHET WRENCH NEEDED. No split parts. Fewer parts—each joint consisting of one complete pipe, one solid follower ring, one solid ring gasket, bolts and nuts.

FULL 15° TURNING DEFLECTION with absolutely no reduction in the full internal opening area—therefore, no abnormal pressure-drops at deflected joints. Deflection stresses evenly distributed among all the bolts.

LONGER LAYING LENGTHS—approximately 18'6"—faster installation, lower costs. However, lengths may be varied to suit conditions. For example: 6 foot, 12 foot or other special lengths may be advisable to suit required curvature.

Mail coupon for complete information on Clow Ball-and-Socket River-Crossing Pipe. No obligation, naturally.

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201-299 North Talman Avenue • Chicago 80, Illinois

Subsidiaries:
Eddy Valve Co., Waterford, N. Y.
Iowa Valve Co., Oskaloosa, Iowa

JAMES B. CLOW & SONS
201-299 North Talman Avenue
Chicago 80, Illinois

Please send me, without obligation, details and specifications of Clow Ball-and-Socket River-Crossing Pipe.

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Street Address________________

City________ **Zone**______ **State**______

Individual's Name________________

Position________________

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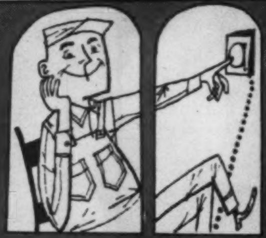

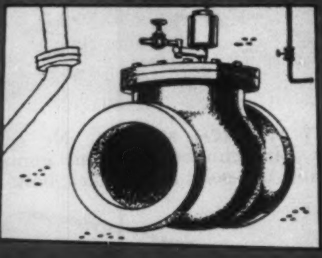

√ or by many other types of electrical impulse

√ Use the angle body and save the price of an elbow fitting

√ Positive Control

√ Sizes ½" thru 36"

√ Used on Water, Oil, Air and Many Other Liquids

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WRITE FOR IT TODAY

GOLDEN ANDERSON
Valve Specialty Company
1208 RIDGE AVE., PITTSBURGH 33, PA.
Designers and Manufacturers of
VALVES FOR AUTOMATION

Hogback Dam, Connecticut

Continued from preceding page

Bids: 7-6-55 Items	Unit	Quantity	Unit Prices 1C	2
Drain hole outlets	lf	175	5.00	2.00
Connectns for groutg	ea	1,000	2.50	10.00
Grout, f & p	cy	500	16.00	35.00
Portland cement for	bbl	2,000	5.00	6.00
Sand for	cy	150	5.00	7.00
Gunite	sy	5,600	4.50	4.00
Conc pipe, 8"	lf	2,700	3.50	2.00
10"	lf	1,700	4.25	2.50
RCP, 12"	lf	650	5.75	4.00
24" & 30"	lf	700	10.00	10.00
36" & 48"	lf	280	18.00	20.00
CIP, 2" through 6"	lf	610	3.70	10.00
8"	lf	330	4.50	15.00
12" through 24"	lf	165	13.20	50.00
4" water line	lf	1,375	5.00	8.00
WIP, 1" through 2"	lf	1,250	2.85	2.00
3" through 8"	lf	1,300	5.00	10.00
Copr tubg & brass pipe	lf	165	5.50	5.00
Conc masnry, for tunl hd	cy	1,060	75.00	40.00
3,500-lb	cy	9,350	45.00	40.00
3,000-lb	cy	11,170	42.00	35.00
2,500-lb	cy	4,650	20.00	25.00
Granite, ashlar facing	sf	10,900	14.00	20.00
rubble facing	sf	18,430	5.75	9.50
capstones	sf	5,790	9.50	15.00
curbing, laid dry	lf	1,590	7.50	7.50
laid in mortar	lf	840	8.00	8.00
Native stone facing	sf	5,730	4.50	11.00
Stone paving	cy	720	10.00	20.00
Bluestn flag'g laid in mortar, 1" & 2"	sf	1,560	3.25	2.30
on sand bed, 4"	sf	6,850	5.00	5.50
Steel, reinforcing	lb	1,050,000	0.11	0.1
structural	lb	79,000	0.20	0.2
Steel & iron, misc	lb	333,500	0.35	0.3
Copr, brs, brnz & alumn.	lb	32,000	1.00	1.5
Wire rope railing	lf	2,400	1.40	1.2
Anchorages	ea	16	50.00	33.0
Posts, single	ea	16	6.50	7.0
Fence, rustic wood	lf	230	6.00	3.5
stock wire	lf	1,025	0.65	0.5
Road boulders	ea	330	10.00	10.0
Bit Macadam paving	sy	27,300	1.50	0.6
Processed gravel	cy	7,200	3.00	3.5
Bitum surface treatment	sy	10,500	0.35	[illegible]
Bitum concrete	cf	830	1.00	1.3
Catch basins	ea	42	150.00	250.0
Access road gates	ls	job	4,000	2,50
Glass block windows	ls	job	2,500	3,50
Hollow tile	ls	job	1,500	4,00
Corkwood insulation	ls	job	4,500	2,00
Brick masonry	ls	job	7,500	10,00
Tar & gravel roofing	ls	job	1,000	1,20
Wood door	ls	job	2,500	50
Partitions	ls	job	500	50
Instalg sluice gates	ls	job	5,000	15,00
Stop logs & lifter	ls	job	15,000	20,00
Transite conduits, 2" & 4"	lf	3,600	1.25	2.0
Electrical work	ls	job	25,000	50,00
Plumbing work	ls	job	1,000	5,00
Painting	ls	job	5,000	15,00
Asphalt waterprfg, 1/16"	sf	12,300	0.08	0.2
1/8"	sf	40,500	0.12	0.2
Misc equip, f & i	ls	job	10,000	20,00
install	ls	job	2,500	5,00
Bronze plaq & seal, i	ls	job	500	50
Cleaning up	ls	job	25,000	5,00

*f furnish *p place *i install

Altoona, Pa. Revamps and Enlarges Waterworks

In five contracts totalling $2.37 million Altoona City Authority will repair two reservoirs, erect three steel elevated water tanks, lay miles of supply and distribution mains and build a new dam and reservoir. Lewis L. Gwin, Altoona, and Albright & Friel, Inc., Philadelphia, are consultants, with the former handling the bids on the reservoirs, tanks, and pipelines and the latter the bids on the new dam and reservoir and the electrical work.

Work includes guniting Prospect and Super High Reservoirs, foundations for three steel tanks, $138,994; furnishing and erecting tanks, $32,930; transmission and distribution lines, with alternate bids, on some 16,500 lin ft of 8-in asbestos-cement or CI roll-on joint pipe and 57,500 lin ft of 10-in, 12-in, 16-in, 20-in and 24-in CI mechanical joint pipe with related work including repaving over pipe trenches, $1,015,447.

One alternate was accepted on these pipelines which means that all lines 10-in to 20-in will be cement lined, mechanical joint cast iron. All lines under 10-in will be asbestos cement, and the 24-in line will be prestressed concrete. Quantities include 15,000 lin ft of 8″ asbestos cement, 1,800 lin ft of 10″ cement lined CIMJ, 27,700 lin ft of 12″, 7,750 lin ft of 16″ and 5,450 lin ft of 20″ cement lined CIMJ, 10,800 lin ft of 24″ prestressed concrete pipe. Cast iron pipe is ASA-A21.6 and/or A21.8-1953, AWWA C-106-53.

Mill Run Dam and Reservoir construction will run $1,176,320 plus electrical work, $8,517, which includes some work at Prospect Hill Reservoir. This is an earth dam with capacity of 876 million gallons and yield o 3 mgd. Its crest is 1,200 ft long an its maximum height is 90 ft, its slop is 1:3. Work includes concrete spillway, concrete lined spillway discharg channel, concrete intake, cast iron outlet pipe, meter house, access road an related construction. Class A concret must test at 3,750 psi and Class B a 3,250 psi. Cast iron pipe is Fed Spe WWP421, pipe Cl 150, fittings Cl D.

The bidders on each contract include:

Reconstruct Reservoirs
Construct Foundations for Tanks

1C	Payne-Oliver Concrete Co., Falls Church, Va.	$138,99
2	Altoona Plumbing, Heating & Ventilating Co.	140,27
8	Cement Gun Co., Inc, Allentown, Pa.	172,13

Prospect Park

Bids: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	2
Excav & backfill	ls	job	$4,662	$6,00
Tank foundation ... ip	ls	job	*3,954	*2,70
Valve chamber ... ip	ls	job	2,208	2,80
Recondition valve house	ls	job	3,082	2,10
CIP, fittings, valves ... ip	ls	job	16,093	22,74
Pressure mortar, inside vlv hs	bag	195	12.70	7.3
On bottom of reservoir	bag	5,430	6.00	7.3
Inside walls of reservoir	bag	4,050	8.00	7.3
Outside walls of reservoir	bag	1,540	11.65	7.3
Chain link fence	ls	job	4,261	3,53
Copper water stop	lf	600	1.62	1.0

* for 56′ ϕ, 300,000-gal steel tank   ip complete in plac

Super High Reservoir

Items	Unit	Quantity	1C	2
Excav & backfill	ls	job	$538	$1,60
Tank foundation ... ip	ls	job	*2,685	*2,20
CIP, fittings & valves ... ip	ls	job	1,630	1,72
Pressure mortar inside res	bag	520	8.55	9.45
Chain link fence	ls	job	828	1,620
Copper water stop	lf	100	1.62	1.00

* for 50′ ϕ, 300,000-gal steel tank

Tank Foundation, Valve Pit at Sylvan Hills

Items	Unit	Quantity	1C	2
Excav & backfill	ls	job	$753	$300
Tank foundation ... ip	ls	job	*1,985	*1,800
CIP, fittings and valves ... ip	ls	job	4,060	1,515
Chain link fence ... ip	ls	job	1,277	2,163

* for 26′ ϕ, 100,000-gal steel tank

Completion time: 348 days-1C, not given-2

Furnish and Erect Steel Tank

1C	Chicago Bridge & Iron Co., Pittsburgh, Pa.	$32,930
2	Risher Tank Co., Chester, Pa.	35,160
6	Pittsburgh Des Moines Co, Pittsburgh, Pa.	43,960

Bid Date: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
56-ft diam, 300,000-gal tank	ls	1	$13,900	$14,995
50-ft diam, 300,000-gal tank	ls	1	11,990	12,995
26-ft diam, 100,000-gal tank	ls	1	7,040	7,170
Completion time: days			172	210

Water mains, incl. earth excav. & backfill

1C	Intercounty Construction Corp., Hyattsville, Md.	$1,015,447
2	New Enterprise Stone & Lime Co., Inc., New Enterprise, Pa.	1,035,428
EE	Lewis L. Gwin, Altoona, Pa.	1,147,958

Main feeder

Bids: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Cmt lined CIP 20" ϕ up to 6' deep	lf	2,906	$16.50	$14,50
20" pipe, 6'-8' deep	lf	70	1.40	15.30
Excav, rock trenches	cy	400	15.00	3.00
Gate valves & vlv bxs, 20"	ea	4	820.00	1,100
Crossings, RR at 23rd St.	ls	job	5,750	7,200
Air release vlv & MH 1"	ea	1	370.00	300.00
Perm repav over 20" pipe 9" conc	lf	2,906	4.65	4.10
1½" bit on 7" conc base	lf	1,562	4.60	4.25
Fittings for all piping	ls	job	1,100	2,100
Shoring, lip	Mbm	1	115.00	150.00
Pipe crdl&pltfrm, wood lip	Mbm	1	170.00	150.00
Concrete, cl C	cy	50	30.00	40.00
Addl cost, substitut std gate vlv MH for vlv box	ea	1	*660.00	*300.00

Water distribution mains

Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Cmt lin CIP				
12" ϕ up to 6' deep	lf	7,202	10.60	8.00
12" ϕ 6' to 8' deep	lf	100	2.40	8.60
Excav for rock trenches	cy	300	18.00	3.00
Tap sleeve & gate vlv & vlv box,				
12" x 12"	ea	1	480.00	350.00
6" x 6"	ea	3	180.00	130.00
Gate vlvs & boxes, 12"	ea	25	215.00	207.50
6"	ea	1	95.00	75.00
4"	ea	1	67.00	54.00
2"	ea	2	45.00	34.00
Xing under storm sewer	ls	job	590.00	1,000
utilities	ls	job	450.00	3,500
Perm repav, 9" conc, 12" pipe	lf	658	5.20	3.50
2¼" ID 12" pipe stone block replaced by 8" stone base	lf	2,670	2.80	2.50
8" stone base	lf	2,284	2.70	2.50
Conc sdwlk 4", 5' wide, 12" pipe	lf	595	3.75	2.50
Fittings for all piping	ls	job	1,950	800.00
Fire hyd compl 5", 3-way, 5'	ea	6	300.00	450.00
Shoring lip	Mbm	2.5	105.00	150.00
Pipe crdl or platfrm, wood lip	Mbm	2.5	160.00	150.00
Concrete, cl C	cy	75	30.00	40.00
Service taps&runs, 10' aver, 2"	ea	2	175.00	60.00
¾"	ea	62	65.00	31.00
Cmt lined CI mech jt, 12" pipe, up to 6'	lf	8,207	7.60	8.00
Xtra pay ea exc&bf 12" pipe 6' to 8' deep	lf	300	1.10	8.60
Excav for rock trenches	cy	100	15.00	3.00
Gate vlvs & boxes: 12"	ea	19	215.00	210.00
Xings 58th St. bridge	ls	job	725.00	1,500
Under Plank Road	ls	job	1,210	3,000
Under road drain	ls	job	115.00	700.00
Perm repav 2¼" ID bit surf for 12" pipe, 8" stone base	lf	2,040	2.70	2.50
Fittings for all piping	ls	job	2,530	725.00
Fire hyd compl 5", 3-way, 5'	ea	9	300.00	50.00
Shoring, lip	Mbm	2	100.00	150.00
Cradles or platforms	Mbm	2	150.00	150.00
Concrete, uncl cl C	cy	100	30.00	40.00
Servc ln, ¾" tap, aver 15' run	ea	11	85.00	50.00
Blow-off branch, 12" x 4"	ls	job	215.00	250.00
Cmt lined CI mech jt pipe up to				
6' deep 12" CIP Cl 22	lf	8,233	8.00	8.00
Cl 23	lf	1,737	8.30	8.20
8" CIP Cl 22	lf	697	4.80	5.40
Cl 23	lf	564	5.00	5.50
8" asb cmt pipe	lf	3,625	4.40	4.70
6" CIP Cl 22	lf	20	4.00	4.50
4" CIP Cl 22	lf	20	3.50	3.90
Xtra pay for ea exc&bf 12" pipe				
6' to 8' deep	lf	750	0.70	8.40
8' to 10' deep	lf	100	1.80	8.90
8" pipe, 6' to 8' deep	lf	200	0.70	5.00
8' to 10' deep	lf	200	1.20	5.40
10' to 12' deep	lf	200	2.30	6.00
Excav for rock trenches	cy	400	18.00	3.00
Tap slv, vlv & vlv box				
8" x 8"	ea	1	300.00	200.00
6" x 6"	ea	1	230.00	150.00
Gate vlvs & boxes: 12"	ea	14	215.00	225.00
8"	ea	9	120.00	125.00

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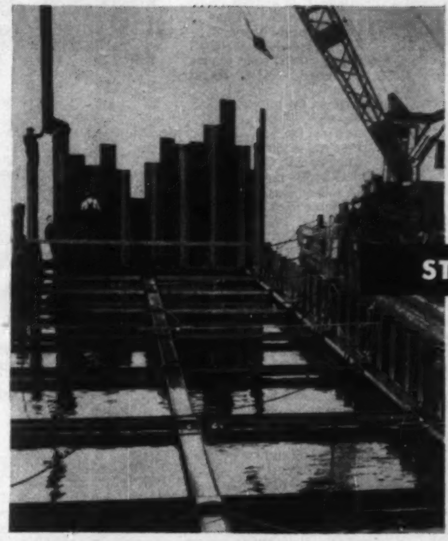
Foster's Rental Piling



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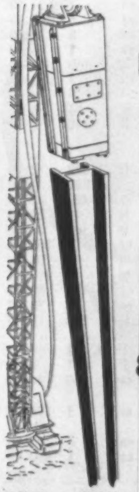

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CHICAGO 4, ILL. • HOUSTON 2, TEX. • LOS ANGELES 5, CAL.

Altoona Waterworks

Continued from preceding page

Bids: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	2
Xing Brush Run	ls	job	2,000	2,500
Air release vlv & MH, ¾"	ea	2	260.00	300.00
Perm repav, 12" pipe,				
8" conc	lf	2,575	5.70	3.50
6" stn base, 1½" ID bit surf	lf	125	2.40	2.20
8" pipe, 9" stn base, 2¼" IDbs surf	lf	1,760	2.10	2.30
Fittings for all piping	ls	job	3,400	2,500
Fire hyd, 5", 3-way, new	ea	9	440.00	450.00
5", 3-way, reset	ea	2	80.00	250.00
Shoring, lip	Mbm	2	100.00	150.00
Pipe crdl or pltfrm, wood, lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	100	30.00	40.00
Service line ¾" taps, 40' runs	ea	99	115.00	120.00
1", 40' runs	ea	8	125.00	150.00
1½", 40' runs	ea	3	175.00	175.00
Blow-off branch, 12" x 6"	ea	1	175.00	276.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-42/a Tp 2; ASA A:21.6; ASA A21.8) incl ea exc & bf up to 6' deep, 8" pipe, alt	lf	4,070	*4.35	*4.70
Asb-cmt pull-on jt up to 6' deep, 8" pipe	lf	2,777	5.00	4.70
2" pipe	lf	40	4.00	3.40
Xtra pay ea exc & bf for 8" pipe, 6' to 8' deep	lf	50	1.70	4.70
Excav for rock trenches	cy	25	16.00	3.00
Tap sleeve, gate vlv&box: 8" x 2"	ea	1	140.00	100.00
Gate vlvs & boxes, 8" pipe	ea	11	120.00	125.00
Perm repav, 8" stone base, 2¼" ID bit surf for 8" pipe	lf	1,290	1.75	2.20
Fittings for all piping	ls	job	740.00	750.00
Fire hyd, 5", 3-way, 5'	ea	4	340.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Crdls or pltfrms, wood lip	Mbm	1	160.00	150.00
Concrete, uncl cl C	cy	60	30.00	40.00
Service line 2" tap, run 15'	ea	6	180.00	100.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-421A- Tp 2; ASA-A21.6; ASA-A21.8), incl ea exc & bf up to 6',				
8" pipe alt	lf	2,777	*5.00	*4.70
2" pipe alt	lf	40	*4.00	*3.40
Cmt lined Cl mech jt up to 6' dp				
16" pipe	lf	1,659	11.00	11.50
12" pipe	lf	2,330	7.60	8.00
10" pipe	lf	1,797	6.40	7.00
6" pipe	lf	77	4.60	4.60
Xtra pay ea exc & bf 16" pipe, 6' to 8' deep	lf	120	1.20	12.00
Excav for rock trenches	cy	400	16.00	3.00
Tap sleeve, gate vlv & box, 6" x 6"	ea	1	220.00	150.00
Gate vlve & boxes, 16"	ea	4	520.00	500.00
12"	ea	8	225.00	250.00
10"	ea	8	175.00	200.00
6"	ea	1	90.00	100.00
Xing Spring Run Bridge	ls	job	800.00	1,500
Air release vlv&MH, 1"	ea	1	260.00	350.00
Perm repav, 9" conc, 16" pipe	lf	45	5.50	3.50
10" pipe	lf	846	3.60	3.00
8" stone base, 2¼" ID bit surf				
16" pipe	lf	1,652	3.20	2.50
12" pipe	lf	631	2.20	2.50
10" pipe	lf	483	2.10	2.40
6" pipe	lf	45	2.10	2.40
Fittings for all piping	ls	job	3,200	4,000
Fire hyd 5", 3-way, 5'	ea	5	300.00	450.00
Shoring lip	Mbm	2	100.00	150.00
Crdls or pltfrms, wood, lip	Mbm	2	100.00	150.00
Concrete, uncl Cl C	cy	100	30.00	40.00
Service lines, ¾", 20' runs	ea	12	85.00	75.00
Blow-off branch, 16" x 6"	ls	job	170.00	750.00
Cmt pipe up to 6' deep,				
8" pipe	lf	4,462	4.50	5.00
for 6" pipe	lf	71	4.50	4.20
Excav for rock trenches	cy	150	14.00	3.00
Tap sleeve, gate vlv&vlv box, 8" x 8"	ea	1	330.00	200.00
Gate vlvs & road box, 8" pipe	ea	7	120.00	150.00
Air release vlv&MH ¾"	ea	1	260.00	350.00
Perm repav 8" stone base, 2¼" ID bit surf for 8" pipe	lf	785	1.80	2.20
Fittings for all piping	ls	job	460.00	550.00
Fire hyd 5", 3-way, 5'	ea	1	350.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Cdls or pltfrms, wood lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	25	30.00	40.00
Servc line, ¾" tap, 20' run	ea	3	75.00	75.00
Cl roll-on jt cmt lined dist mains (Fed. Spec. WW-P-421A Type 2; ASA-A21.6; ASA-A21.8), incl ea exc & bf up to 6'				
for 8" Pipe alt	lf	4,462	*4.50	*5.00
for 6" Pipe alt	lf	71	*4.50	*4.20
Asb-cmt pull-on jt up to 6' dp 8" pipe	lf	3,918	5.65	5.00
Xtra pay ea exc & bf 8" pipe, 6' to 8' deep	lf	150	1.20	5.40
Excav for rock trenches	cy	120	15.00	3.00
Gate vlvs&vlv boxes, 8"	ea	9	120.00	150.00
Air release vlv & MH ¾"	ea	1	270.00	350.00
Perm repav 9" conc, 8" pipe	lf	29	4.70	3.00
8" stone base, 2¼" ID bit surf	lf	2,088	1.80	2.20
Fittings for all piping	ls	job	1,370	750.00
Fire hyd, 5", 3-way—5'	ea	2	310.00	425.00
Shoring, lip	Mbm	1	100.00	150.00
Pipe crdl or pltfrm, wood lip	Mbm	1	160.00	150.00
Conc uncl Cl C	cy	20	30.00	40.00
Serv ln ¾" tap, av 16' run	ea	6	70.00	75.00
Cl roll-on jt cmt lined dist Mains (Fed. Spec. WW-P-421a Type 2; ASA-A21.6; ASA A21.8) incl ea exc & bf up to 6' 8" pipe	lf	3,918	*5.60	*5.00
Cl cmt lined incl ea exc & bf up to 6' deep, 16" pipe	lf	4,133	16.00	16.10
Xtra pay ea exc & bf, 6' to 8' deep	lf	250	2.25	18.20
Tap sleeve & gate vlv & vlv bx				
16" x 12"	ea	1	710.00	400.00
16" x 16"	ea	1	1,100	800.00
Gate vlvs & boxes: 16"	ea	8	510.00	525.00
Xing under utilities	ls	job	270.00	2,500
Perm repav 9" conc, 16" pipe	lf	1,225	4.60	3.50
2¼" ID bit surf for 16" pipe,				
8" conc base	lf	1,065	4.70	3.80
8" stone base	lf	1,303	2.60	2.50
Fittings for all piping	ls	job	3,400	3,000
Fire hyd 5", 3-way, 5'	ea	5	400.00	500.00
Shoring, lip	Mbm	5	100.00	150.00
Pipe crdls or pltfrms, wood lip	Mbm	3	160.00	150.00
Concrete, uncl Cl C	cy	50	30.00	40.00

Water transmission mains

Items	Unit	Quantity	Unit Price 1C	2
Cmt lined Cl mech jt up to 6', 16" pipe	lf	1,947	10.20	11.50
Xtra pay ea exc & bf, 16" pipe, 6' to 8' deep	lf	50	1.10	12.00
Tap sleeve, gate vlv & vlv box: 16" x 16"	ea	1	1,080	750.00
Gate valve & box: 16"	ea	4	500.00	500.00
Xings Mill Run Stream	ls	job	1,120	4,000
Fittings for all piping	ls	job	1,150	2,500
Shoring, lip	Mbm	1	100.00	150.00
Pipe crdls or pltfrms, lip	Mbm	1	160.00	150.00
Concrete, uncl Cl C	cy	5	30.00	40.00
Cmt lined Cl mech jt 20" pipe up to 6' deep	lf	2,551	15.30	14.50
Xtra pay for ea exc & bf for 20" pipe, 6' to 8' deep	lf	100	1.10	15.50
Excavation rock	cy	50	18.00	3.00
Tap sleeve, gate vlv&box 24" x 20"	ea	1	2,000	1,800
Gate vlv & boxes, 20" pipe	ea	5	800.00	1,400
20" by-pass	ea	1	910.00	1,500
Perm repav, 9" conc, 20" pipe	lf	48	5.50	4.00
8" stone base, 2¼" ID bit surf, for 20" pipe	lf	2,368	2.60	3.00
Fittings for all piping	ls	job	1,900	5,500
Crdls or pltfrms, lip	Mbm	2	155.00	150.00
Concrete, uncl Cl B	cy	100	30.00	40.00
Pres control chamber, incl piping, fittings & vlvs	ls	job	14,600	18,500
Blow-off branch 20" x 6"	ls	job	400.00	500.00
Cmt lined Cl mech jt 24" pipe, up to 6' deep	lf	10,768	18.15	20.50
Xtra pay for ea exc & bf 24" pipe, 6' to 8' deep	lf	60	2.75	21.00
Excav for rock trenches	cy	100	14.00	3.00
Gate vlvs&boxes, 12" conn at Present Mill Run Dam, 12"	ea	1	714.00	750.00
24" by-pass vlv&MH chamber, no valve box	ea	9	1,770	1,600
Xings, thru RR culv	ls	job	835.00	10,500
Stream	ls	job	1,160	3,400
Perm repav, 8" stone base, 2¼" ID bit surf	lf	3,625	2.40	3.00
Fittings for all piping	ls	job	8,600	5,500
Shoring, lip	Mbm	3	100.00	150.00
Pipe crdls or pltfrms, lip	Mbm	2	155.00	150.00
Concrete, uncl Cl C	cy	200	30.00	40.00
Vacuum release vlv&MH	ea	1	250.00	400.00
Blow-off branch, 24" x 8"	ea	1	475.00	350.00
Monument markers lp	ea	6	35.00	15.00
Prestressed conc pipe, AWWA Spec C301-52, 24" pipe, up to 6' deep alt	lf	10,768	*14.25	*17.00

• bf backfill • lip left in place * alternate

Mill Run Dam & Reservoir

1C	Sanctis Construction, Inc., Pittsburgh, Pa.	$1,176,320
2	Lycoming Constr Co., Inc., Williamsport, Pa.	1,192,237
14	Joint Venture, N. R. Corbisello Inc. & Triple Cities Constr Co., Binghamton, N. Y.	3,152,940
EE	Albright & Friel, Inc., Philadelphia, Pa.	1,487,210

Bids: 8-3-55 Items	Unit	Quantity	Unit Prices 1C	2
Care & diver of stream	ls	job	$7,000	$15,500
Clear grub, borrow area	acre	34	410.00	650.00
Dam site & spillway	acre	18	500.00	650.00
Reservoir area	acre	115	410.00	550.00
Excav, unclassified				
Strip borrow area & dam site	cy	53,000	0.45	0.70
Cutoff trench, drains & rock toe trench	cy	21,000	0.50	1.10
Intake & outlet wks incl meter house	cy	17,250	0.85	1.50
Splwy & rdwy to intake	cy	116,500	0.80	1.00
Borrow area incl haul to dam	cy	347,000	0.43	0.44
Access rds & culv	cy	9,000	0.45	0.55
Line drilling	sf	4,000	1.50	1.50
Rolled-fill embankment				
from borrow area	cy	315,000	0.25	0.20
from spillway excav	cy	120,000	0.15	0.15
Sand filters & drains in embankment	cy	15,500	6.00	6.05
Dumped riprap	cy	16,600	5.05	2.90
Rock fill in toe trench	cy	8,000	5.05	2.80
Addl rolling, embank, 5 million sf, 1 pass	ls	job	4,000	500
Backfill, spillway	cy	4,050	0.45	1.00
Outlet wks, compact along pipe encase	cy	1,800	2.85	1.15
Structural along 42" pipe & meter house	cy	1,800	2.85	1.70
Conc intake structure	cy	250	65.00	55.00
Outlet pipe encase	cy	500	32.00	37.50
Meter house, chan pav, pipe anchors etc	cy	40	65.00	70.00
Spillway weir, pier & spillway bucket	cy	1,700	45.00	38.00
Spillway walls & ftgs	cy	1,420	42.00	42.00
Spillway floor slab	cy	570	32.00	30.00
Bridge flr, culv end walls	cy	55	80.00	90.00
Gunite	sf	1,800	2.00	2.30
Spillway, under drains incl excav, sand fill & 6"VCP	lf	704	2.75	1.70
Sand &/or gravel wall & weir drains	cy	40	25.00	10.00
Black steel grout pipe	lb	900	1.50	0.30
Wipipe, wall & floor drains	lb	500	3.00	0.40
Drill grout holes, in				
overburden	lf	2,500	3.15	3.60
rock	lf	1,810	3.50	4.00
Cement grout	cf	7,000	3.60	4.10
Reinforcing steel	lb	135,000	0.13	0.14
CIP 42" ϕ CIB	lf	1,030	63.00	68.00
CIP for meter house & connect incl valves, venturi tubes recorders, couplings	ls	job	17,650	14,500
Meter house above elev	ls	job	3,000	5,800
Copper water stops	lb	2,800	1.85	1.25
Sh cork jt fill #514, ¼"	sf	1,800	0.45	1.00
Sluice gate & oper stand,				
36" x 48"	ea	1	5,600	6,100
30" ϕ	ea	4	2,500	2,300
Cl gatevalve & oper stand, 30" ϕ	ea	4	3,000	2,900
Cl gate valve geared, handwheel, 42" ϕ	ea	1	6,000	6,000
Cl wall castings, 30"	lb	8,000	0.50	0.35
Struct steel spillway bridge	lb	28,000	0.30	0.20
Floor grating	sf	360	3.20	5.00
Chain link fencing	lf	41	5.00	10.00
Misc metal, see MM	lb	13,000	0.45	0.55
Air compressors, bubbler piping, compressor housing	ls	job	1,800	2,800
Conc culv pipe, fl&bf,				
18" ϕ	lf	30	8.00	8.00
24" ϕ	lf	30	10.00	12.00
30" ϕ	lf	30	14.00	14.00
Surf roads, parkg areas	sy	8,700	3.85	3.25
Highway guard fence, P.D.H. type 1C	lf	3,900	1.94	1.75
Railing on splwy bridge	lf	168	8.00	10.00
Splwy flow meter & hsg	ls	job	1,222	3,000
Meter house heater & 550 gal tank	ls	job	1,245	1,250
Plumbing, incl floor drain, lavatory & water supply, waste & sewer	ls	job	500.00	800.00
Chlorinating apparatus	ls	job	13,850	14,000
Ventilating fan & duct	ls	job	1,000	900.00

• f furnish • l install • bf backfill

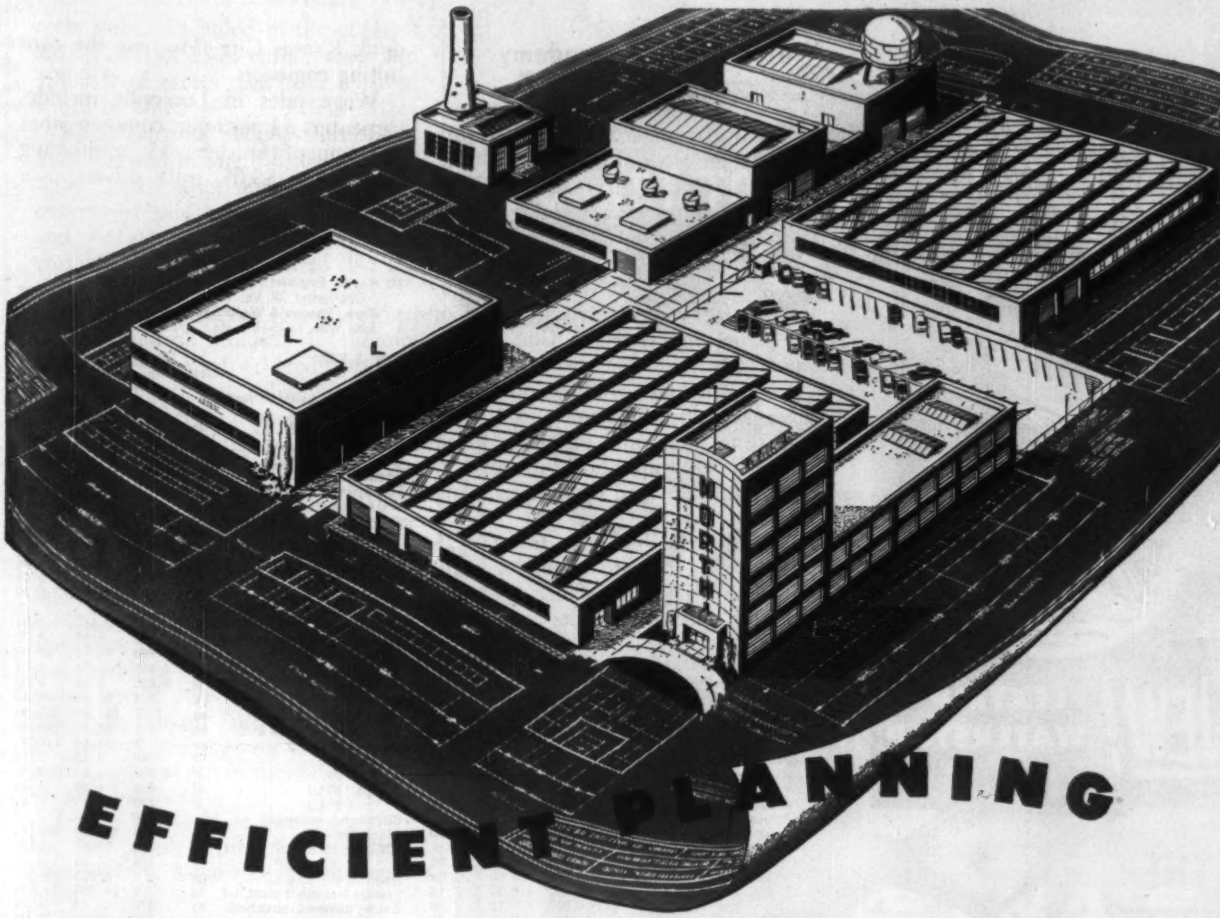
• MM incl trash racks, screens, screen guides & supports, hoists & frames, ladders, stem guide supports, deck framing, wall castings, etc.

Completion time: 444 calendar days

Potable Water Supply for Air Force Academy, Colo.

The first contract to provide water for the Air Force Academy, 12 miles north of Colorado Springs, is for $399,235 awarded to Wade Lahar Construction Co. of Tulsa for constructing 38,600 lin ft of supply lines

Continued on following page



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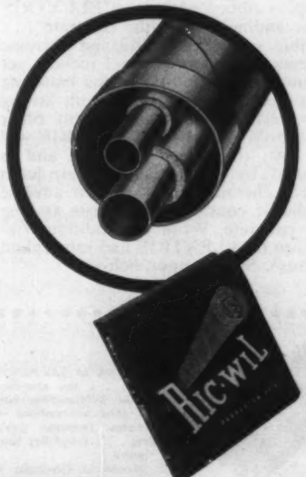

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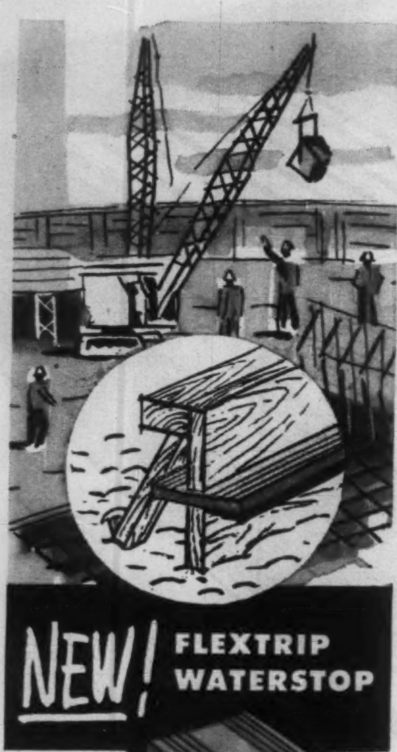

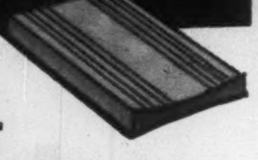

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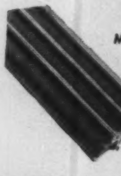

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Water for A F Academy

Continued from preceding page

from the Colorado Springs 24-in supply line on West Monument Creek. Work is for the Air Force Academy Construction Agency, Major T. E. Correll, USAF, contracting officer and assistant chief of staff, installations. Skidmore, Owings & Merrill, Chicago, are architect-engineers, Robert & Co. Associates, Inc., Atlanta, Ga., are engineers.

Work includes 400 ft of tunnel through rock, excavation and trenching, furnishing and installing 12-in and 16-in steel pipe and 12-in cast iron pipe, gate valves and pressure reducing valves.

Minimum wages range from $1.75 for common labor to $1.90 for semi-skilled and $2.50 for skilled trades.

Eleven bidders include:

1C	Wade Lahar Construction Co., Tulsa, Okla	$399,235
2	Brodie Construction Co., Amarillo, Tex	417,294
11	A & A Construction Co., Muskogee, Okla	847,902

Bids: 7-1-55 Items	Unit	Quantity	Unit Prices 1C	 2
Tunnel, portal exc, open cut	lf	45	$50.00	$25.00
Exc, unclass	cy	775	35.00	45.00
Timber, incl portals..lp	Mbf	18	450.00	300.00
Exc, rock in trench & structs	cy	5,000	5.00	5.00
Steel water pipe,16", 3/16"	lf	5,000	12.40	10.00
1/4" wall thickness	lf	1,120	13.00	11.20
12" pipe, 3/16" wall	lf	17,600	6.80	7.15
1/4" wall	lf	4,950	7.75	7.80
8" pipe, 3/16" wall	lf	600	5.15	5.50
Cl pipe, Cl 150, 12"	lf	1,000	6.55	7.50
Cl 250, 12"	lf	2,850	7.05	8.30
Gate valve & box				
16" with by-pass, Cl 250	ea	2	1,250	1,500
12", Cl 150	ea	8	250.00	410.00
Cl 250	ea	6	300.00	640.00
8", Cl 150	ea	3	150.00	185.00
Cl 250	ea	3	200.00	370.00
Air vacuum relief vlv incl MH	ea	11	275.00	450.00
4" blow-off valve assemb Cl 250	ea	12	100.00	150.00
4" Cl blow-off pipe, Cl 250	lf	800	3.00	5.00
8" pressure reducing valve	ea	3	750.00	650.00
Conc, PC, blockg, piers, anchor	cy	680	50.00	70.00
Steel, reinf	lb	22,000	0.20	0.25
Pipe slope anchors	set	80	150.00	25.00
Sheeting & shoring, lip	Mbm	10	200.00	250.00
Testing pipe	ls	job	1,000	1,500
Xtra 12" steel pipe & coupl, 3/16" wall....f	lf	400	4.00	7.15
Concrete monuments	ea	120	10.00	25.00

• f furnish • lip left in place

Sewerage

Water Supply and Sewage Disposal, Kentucky Turnpike

Water supply and sewerage facilities for Lebanon Junction and Shepherdsville service areas, Kentucky Turnpike from Louisville to Elizabethtown will be built by Hayne Engineering Co., Charleston, W. Va., the low bidder at $323,991. This award is on the alternate using poured concrete construction of sewage pumping station rather than the concrete pipe design. D. H. Bray, state highway engineer is in charge of the turnpike construction. Howard, Needles, Tammen & Bergendorff, Kansas City, Mo., are the consulting engineers.

Wage rates in Louisville include: carpenters $3 per hour, common labor $2, cement finishers $3, reinforcing ironworkers $3.05, truck drivers, over 1½-ton $2.26.

Bidders include:

1C	Hayne Engineering Co & Andersons' Inc., Charleston, W. Va.	$323,991
2	Clark, Stewart & Wood Co., Lexington, Ky	373,518
4	John Wile, Louisville, Ky	391,865

Bids: 8-5-55 Items	Unit	Quantity	Unit Prices 1C	 2
Wells, water, Lebanon Junction	ea	2	$4,094	$5,335
Cl pipe, 3" Cl 150 LJ	lf	1,400	3.20	3.30
6"	lf	875	4.00	4.20
Gate-road box, 3" LJ	ea	2	73.00	70.00
Check valve, 3" LJ	ea	2	73.00	59.00
Fire hydrant, 4" LJ	ea	2	151.00	227.00
Water treatment plant, LJ	ls	1	42,741	47,213
Direct burial cable, 3#250 MCM & 1#4 AWG, LJ	lf	2,600	5.10	5.50
4#8 AWG, LJ	lf	540	2.55	2.55
Cl A concrete	cy	5	62.50	34.00
Cl D Cl fittings LJ	lb	550	0.50	0.54
Steel, reinforcing	lb	500	0.16	0.19
Vert turbine water pump, Shepvl	ea	1	2,087	4,954
Excav, common, structure	cy	80	3.65	3.75
solid rock, structure	cy	200	16.70	25.00
Cl D Cl fittings, S	lb	1,650	0.50	0.54
Cl pipe, Cl 150 6" S	lf	8,855	4.00	4.00
Valves, air relief S	ea	4	67.50	192.50
Fire hydrants, 4" S	ea	2	151.00	227.50
Gate valve with box 6" S	ea	1	94.50	100.00
Check valve, 6" S	ea	1	94.50	110.00
VC pipe. 6"	lf	40	3.15	7.73
8"	lf	5,650	3.25	3.20
Ci pipe, 6" LJ	lf	400	4.00	4.23
8" LJ	lf	230	5.40	6.41
Bituminous pavement	sy	170	6.20	7.37
Manholes	ea	13	416.00	500.00
CM pipe, casing 15"	lf	304	15.65	8.24
12"	lf	106	15.65	5.63
Railroad crossing, LJ	ea	1	1,725	3,689
Sewage treatment plant, LJ	ls	1	56,808	74,758
Excav, common, structure	cy	970	3.65	3.75
Solid rock, structure	cy	170	16.70	25.00
Concrete, Cl A	cy	10	62.50	34.00
Steel, reinforcing	lb	700	0.16	0.19
Cl pipe, Cl 150 4" S	lf	2,300	3.30	3.13
Sewage treatment plant, S	ls	1	58,153	76,923
Borrow	cy	300	3.65	3.75
Direct burial cable, 3#1 AWG & 1#8 AWG S	lf	580	3.25	3.03
3#2 AWG & 1#8 AWG S	lf	1,440	3.05	2.48
Elev. steel water tank, 40 M gal	ls	1	22,700	22,561
Sewage pump sta, pour conc	ls	1	10,785	10,034
conc pipe cons alternate	ls	1	10,785	10,334

Sewage Treatment Plant by N Y Board of Water Supply

The Margaretville-Arkville sewage treatment plant in Middletown, Delaware County, N Y will cost New York City's Board of Water Supply $1,079,287. The main contract to Thompson-Starrett represents 92 percent of this total, with 5.5 percent to a separate electrical contract and 2.5 percent to heating and ventilating. Equipment included in the main contract represents 21.9 percent of the total cost. Additional equipment is to be furnished by the city including substation and electrical control and chlorinating equipment.

The treatment plant includes a control building, digester building, two primary settling tanks, four sludge drying beds in glass enclosure, a sludge lagoon, filter dosing tank, six intermittent sand filter beds, water supply system, unsewered wastes tanks, outlet sewer and the necessary piping and equipment. Buildings will have brick walls with flat roofs of reinforced concrete slabs. Included in the contract are 1,720 ft of 15-in outfall sewer and 1,800 ft of access road with a paved width of 18 ft.

Electrical work includes furnishing, installing and testing the electrical systems and miscellaneous electrical equipment plus caring for, installing and testing substation and control equipment to be furnished by the city.

The heating system to be installed in the control building is thermostatically controlled, oil-fired, low pressure steam with one radiator and four propeller-fan type unit heaters. In the digester building heating is by a thermostatically controlled, 2-zone, recirculating hot water system with two radiators and one propeller-fan type unit heater supplied by hot water generated by the sludge digester installed under the treatment plant contract. Ventilating equipment includes nine stationary roof ventilators for the control building, digester building and water service pump chamber, four elbow type exhaust fans at the roofs of the control and digester building and a small exhaust fan in the water service pump chamber.

Irving V. A. Huie is president of the New York Board of Water Supply, Karl R. Kennison is chief engineer.

The bidders on this job were:

1C	Thompson-Starrett Co., Inc., Chicago, Ill., and New York, N. Y.	$993,299
2	Grove, Shepherd, Wilson & Kruge, Inc., New York, N. Y.	1,171,634
3	Shanahan Construction Co., Inc., Ellenville, N. Y.	1,648,550

Bids: 7-12-55 Items	Unit	Quantity	Unit Prices 1C	 2
Remov soil	cy	6,500	$0.72	$0.45
Excavation, earth	cy	15,000	2.45	2.35
Refilling & embanking	cy	85,000	1.05	1.15
Excav, & refil pipe trnch				
up to 8′ earth	cy	8,000	1.90	4.10
8′-12′	cy	2,000	6.65	5.25
over 12′	cy	2,000	6.65	7.00
Excavation, rock	cy	100	30.00	11.50
Surface dressng & grassng	cy	6,500	1.95	3.60
Pipes, VC or alt 6″ & 8″	lf	1,500	1.65	2.30
10″	lf	500	2.55	3.50
12″	lf	750	3.55	4.15
15″	lf	2,900	5.10	6.75
18″	lf	700	5.75	8.00
24″	lf	230	7.45	12.50
30″	lf	675	10.40	16.75
VC pipes, underdrains,				
6″ & 8″	lf	5,000	1.15	2.30
10″	lf	2,300	1.65	3.70
CI pipes & fittings	lb	130,000	0.29	0.25
Misc metal work	lb	65,000	0.45	0.65
Galvanizing	lb	31,000	0.06	0.10
Steel, reinf	lb	250,000	0.17	0.20
Articles of aluminum	lb	3,500	1.75	1.90
Rubber water stops	lb	1,150	1.65	3.20
Concrete & brick masonry	cy	2,000	75.00	80.00
Dry rubble paving	cy	450	24.50	29.00
Rubble paving in mortar	cy	20	30.00	58.00
Portland cement	bbl	3,500	6.00	5.30
Sand, cr stone & gravel	cy	3,000	8.30	13.00
Sand for filt & sldg beds	cy	16,000	8.00	10.00
Timber & lumber	Mbm	75	350.00	330.00
Bitum macadam pavement	cy	2,100	13.50	16.00
Wire fenc & beam-type guide rail	lb	33,000	0.30	0.28
Drill well, water supply	lf	50	120.00	7.00
Valves, sluice & tide gates	ls	job	10,500	23,000
Misc equipment	ls	job	7,000	7,500
Pumps, motors & appurt				
Sewage	ls	job	7,200	15,000
Recirculating	ls	job	1,230	2,000
Sludge	ls	job	3,500	4,000
Sump	ls	job	2,000	1,300
Water	ls	job	5,000	6,000
Misc water	ls	job	1,360	2,200
Comminutor, motor & aprt	ls	job	4,200	4,700

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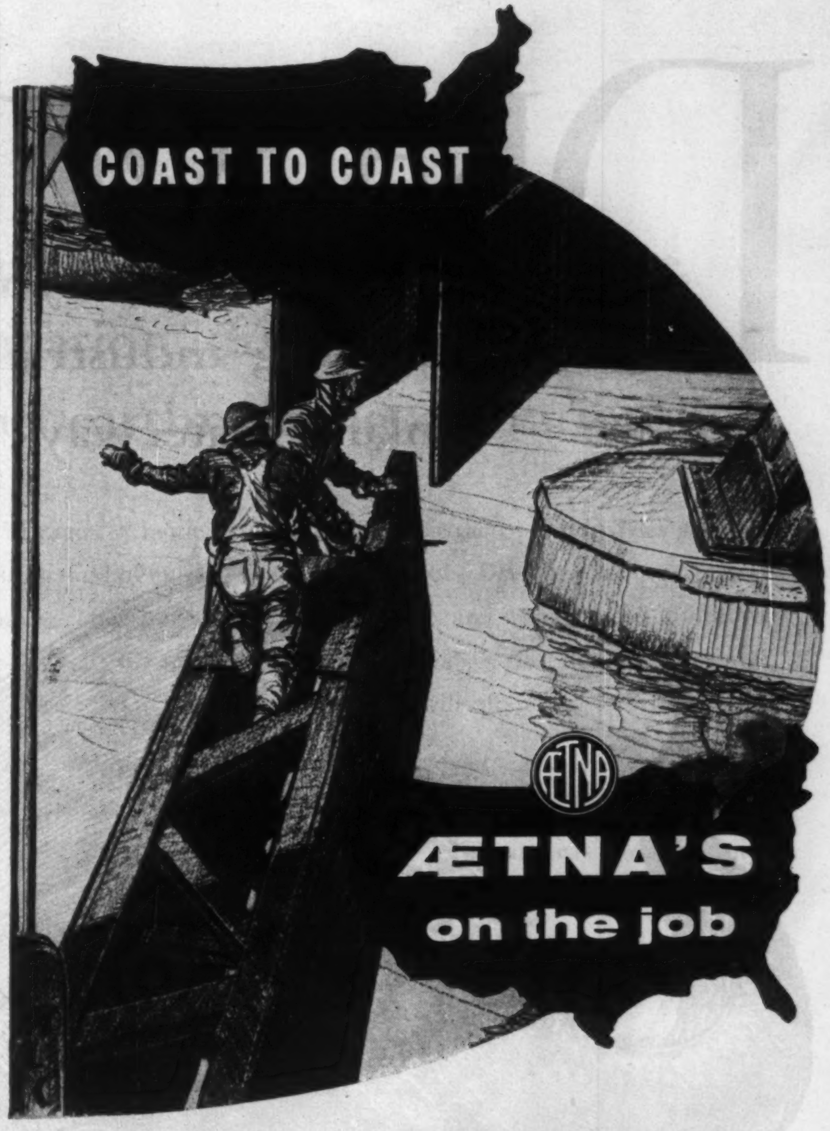

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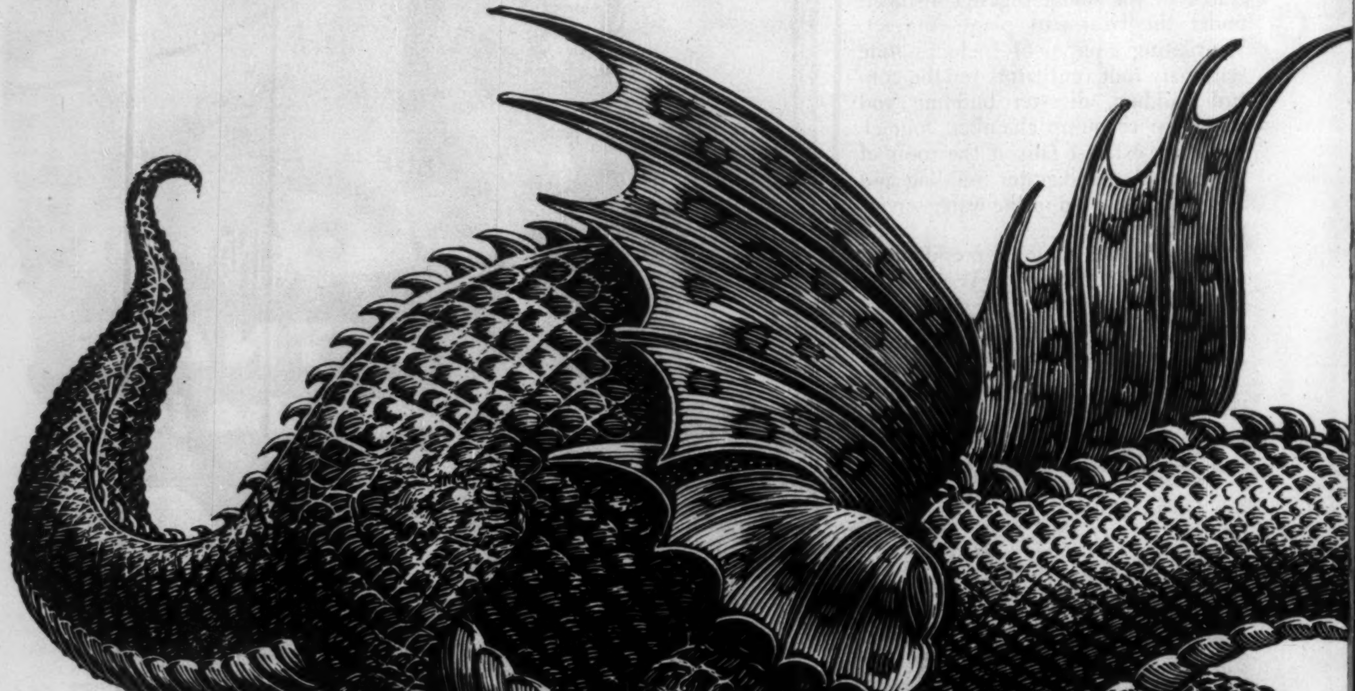

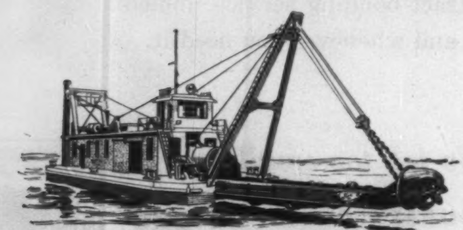

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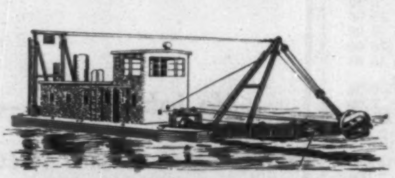
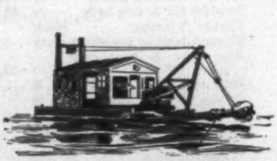


Ellicott "DRAGON" 12—Dredges 100-400 cubic yards per hour of mud, silt, sand and clay and pumps through pipeline up to 4000 ft. long. Works in min. canal width of 50 ft.



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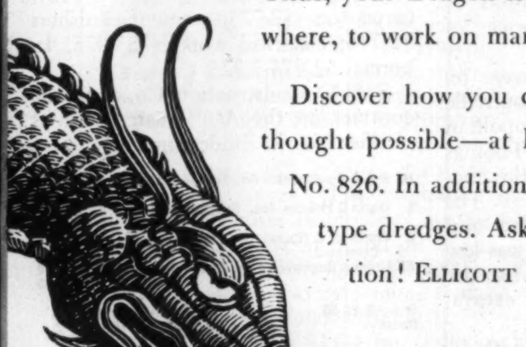

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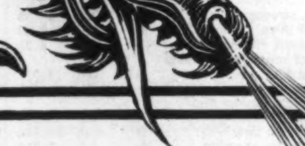

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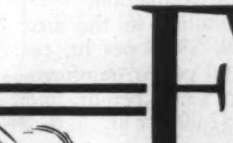

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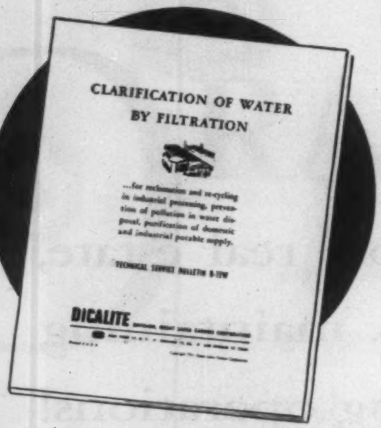
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Sewage Treatment, N Y

Continued from preceding page

Bids: 7-12-55 Items	Unit	Quantity	Unit Prices 1C	2
Sludge collect & scum skim equip, primary settling tanks	ls	job	6,460	13,000
Gasoline-eng generators & appurt	ls	job	13,900	18,000
Filter dosing equipment	ls	job	5,700	8,000
Care for, instal & test chlor equip f by city	ls	job	290.00	1,000
Flow metering equip	ls	job	3,800	4,600
Digestion tanks equip	ls	job	35,800	46,000
Sludge digest gas & heat equip & appurt	ls	job	7,240	9,000
Glass encl & appurt sludge beds	ls	job	17,000	19,000
Superstructures	ls	job	80,000	60,000
Painting	ls	job	14,000	17,000
Engineer's office & sanitary serv	ls	job	8,700	20,000
Cleaning up	ls	job	1,400	7,000

Completion time: 18 months • f furnish

Electrical Systems & Equipment

1C	Lord Electric Co., Inc, New York, N. Y	$58,888
2	L. I. Waldman & Co., Inc., Long island City	68,795

Heating & Ventilating

1C	John R. Philip, Inc., Scarsdale, N. Y.	$27,100
2	Sloan & Greenberg, Inc., New York, N. Y.	29,281

Completion time: 18 months, both contracts

Total project cost $1,079,287

Inverted Egg Sewer, Ky.

An inverted egg sewer of bricklined reinforced monolithic concrete in tunnel under the Louisville & Nashville Railroad Yard in the south central part of Louisville, Ky., includes 1,100 ft of 11-ft by 16-ft 6-in. sewer, and manholes and other connections as necessary at an average price of $764.76 per lin ft.

Five bids, widely spaced, were received on the project by the Louisville and Jefferson County Metropolitan Sewer District, Louisville, Ky. Thomas D. Nolan, of Louisville, took the contract on a low bid of $981,591.50. His bid was 11% below second low and 65% below the high bid. He was low by 21% on the lump sum for the sewer, and led in all items but excavation and backfill.

Work commenced July 11, with 11 months allowed for completion.

Wage rates prevailing in the area include: Bricklayer, $3.27 per hr; cement finisher, $3.00 per hr; reinforcement iron worker, $3.05 per hr; and common laborer, $2.00 per hr.

Bidders include:

1C	Thomas D. Nolan, Louisville, Ky	$981,592
2	Traylor Bros., Inc., Evansville, Ind	1,086,294
5	Dravo Corp., Pittsburgh, Pa	1,617,431

Bids: 6-30-55 Items	Unit	Quantity	Unit Prices 1C	2
Sewer, 11′ 0″ x 16′ 6″	ls	.....	$841,235	$1,020,900
Exc, limestone or shale tunnel	cy	3,100	30.00	2.00
open cut	cy	300	30.00	2.00
Cement grout	bbl	600	14.00	10.00
Drop inlets, 24″	ea	3	550.00	1,500
12″	ea	2	350.00	1,200
Above DI, 24″	vf	30	25.00	25.00
12″	vf	20	15.00	23.00
Cl D concrete refill	cy	500	23.00	25.00
Underdrain, 10″ pipe	lf	470	2.75	6.00
8″ pipe	lf	50	2.25	5.50
6″ pipe	lf	50	1.75	5.00
Underdrain in rock, 10″	lf	500	3.00	6.00
8″	lf	375	2.50	5.50
6″	lf	375	2.00	5.00
Tongue & groove bds, 1″	bdft	6,000	0.25	1.00
Sisalkraft paper	roll	15	15.00	50.00
Presolidification	lf	450	10.00	20.00
Stabilization of matls, 3″ depth	lf	150	1.50	5.00
4″ depth	lf	150	2.00	6.00
6″ depth	lf	150	2.50	10.00
Sandy backfill matls	t	1,000	2.25	1.00
Property serv connectn 12″ pipe	lf	100	6.00	10.00
6″ pipe	lf	100	4.00	8.00
Cement added	sack	1	1.50	1.00

Sewage Treatment at San Francisco's Airport

A $308,405 sewage treatment plant at San Francisco's International Airport will have an operation building 20′x50′x16′, an oil flotation tank 12′x10′, a clarifier 45′x8′, a digester 36′x37′, a 2-story digester pump house 20′x17′x22′ with necessary equipment and a pumping plant 25′x14′x15′. It will be a complete primary sewage treatment plant plus a combined sewage and drainage pumping plant. Utilities Engineering Bureau, Public Utilities Commission, San Francisco is the engineer.

The entire plant is to be built on composite piles in soft San Francisco Bay mud. Cl A concrete must test at 3,500 lb/sq in., Cl B at 3,000. Cast iron pipe is Cl 150 ASA Spec A21.6.

Prevailing wages include: pile drivermen $2.905, plumbers $3.05, concrete mixer trucks $2.0875-2.4425, carpenters $2.775, cement finishers $2.745; electrical workers $3.075, laborers $2.075-2.325.

S & Q Construction Co. took the contract on the A alternate, without clarifier No. 3. Bidders include:

1C	S & Q Construction Co., So. San Francisco	A	$308,405
		B	351,819
2	Oscar C Holmes, Inc., Redwood, Calif.	A	308,688
		B	348,001
3	Engstrum & Nourse, San Francisco, Calif.	A	328,536*
	* Corrected	B	369,736*
EE	Utilities Engineering Bu, San Francisco	A	210,910
		B	244,235

Bids: 5-23-55 Items	Unit	Quantity	Unit Prices 1C	2
Alternate A				
Excav, structure	cy	2,000	$8.35	$5.20
Timber piles, f & d	lf	8,600	2.60	2.45
Met cased, RC pile exten	lf	700	4.25	4.00
Influent sewer to sew pump plant 5	ls	job	4,771	3,700
Sewg & drain pump plant 4	ls	job	31,080	30,374
Oper bldg & minor plnt appurt	ls	job	44,946	41,169
Oil flotation tank	ls	job	10,840	10,457
Comminutor chamber	ls	job	7,910	6,950
Aerator, clarifier 2	ls	job	38,090	42,378
Digester & pump house	ls	job	59,724	69,939
Sludge beds	ls	job	4.875	5,307
Electrical work	ls	job	24,594	22,000
Landscaping	ls	job	1,800	2,000
Chain link fence, 7′ lp	lf	1,100	2.65	2.65
Crush rock pave base	t	500	3.10	3.10
Bitum surface course	t	150	7.20	7.50
WIP, 4″ galv, sch 40	lf	20	14.05	7.20
Pipe, double wrap, galv, sch 40, ½″	lf	225	3.65	1.90
1½″	lf	35	4.80	7.80
2″	lf	300	6.00	2.40
Pipe, double wrap, black sch 40, ¾″	lf	30	2.40	2.12
1½″	lf	60	3.00	2.50
2″	lf	375	3.60	2.85
CIP mechanical joint, 3″	lf	20	15.90	6 20
4″	lf	350	4.80	7.40
6″	lf	1,050	7.10	8.00
8″	lf	525	11.90	15.20
VCPES, 8″	lf	100	11 70	8.60
10″	lf	300	8.00	6.00
12″	lf	350	8.20	9.50

Bids: 5-23-55 Items	Unit	Quantity	Unit Prices 1C	 2
CMP 16 ga galv, 18″	lf	80	18.00	17.60
14 ga galv, 24″	lf	40	13.20	23.00
CMP 16 ga ash bonded with paved invert, 12″	ls	job	14.70	900.00
14 ga 18″	ls	job	3,400	3,200

Alternate B

Items	Unit	Quantity	Unit Prices 1 C	 2
Clarfieri 3	ls	job	$32,166	$28,653
Excav, struct, addl for clar 3	cy	700	5.35	5.20
Timber piles, f & d	lf	2,800	2.30	2.15
Met cased RC pile extension for clarifier 3	lf	250	4.25	4.00

*ip in place *f furnish *d drive *ES extra strength

Time allowed for completion, 270 calendar days Liquidated damages, $30/day.

Intercepting Sewer for Richmond, Va.

Part of a major sewage disposal project which will include treatment facilities for Richmond, this $809,521 Shockoe Creek intercepting sewer contract includes construction of 3,300 lin ft of 96-in reinforced concrete culvert pipe sewer complete with manholes, and intercepting chamber and overflow structures necessary to intercept the sanitary flow from an existing 27-ft x 15-ft arch sewer and a 17-ft x 12-ft box which now discharges raw sewage to the James River. The completed reinforced concrete structures will include three gates 48-in x 72-in, 48-in x 41-in and 48-in x 37-in in size and five 9-ft x 12-ft timber flap gates.

The depth of cut to the invert of the pipe will vary from 20 to 35 ft.

Design is by Greeley & Hansen, Chicago. Construction will be supervised by the Richmond Department of Public Works, Robert S. Hopson, Director.

The owner will furnish manhole frames and covers. The contractor furnishes all other materials. Class C concrete must develop 3,500 psi at 28 days, Class B, 3,500, Class D, 2,000.

Wage rates to be paid range from $1.65 for common labor through $2.50 for semi-skilled to $3.00 for skilled. Rail, highway and water transportation are all available at the site.

The eight bidders include:

1C	E G Bowles, Richmond, Va	$809,521
2	Dominion Contracting Co., Richmond, Va	883,075
8	Ahl Bros Constr Co., Inc, Branchville, Md	1,062,805
EE	Greeley & Hansen, Chicago, Ill	900,330

Bids: 7-5-55 Items	Unit	Quantity	Unit Prices 1C	 2
RC culv P sewer, 96″, 20-35′ deep sta				
0 to 24+75	lf	2,475	$135.78	$175.00
24+75 to 32+93.5	lf	818.5	206.86	300.00
Structs, intercept & overflow	ls	job	245,000	150,000
Manholes, 3′φ, standard	ea	2	1,000	1,550
drop	ea	1	1,200	1,850
Sheeting, lip, wood	Mbm	150	125.00	110.00
steel	lb	50,000	0.125	0.07
Excavation, rock	cy	100	20.00	10.00
Addl earth	cy	700	5.00	9.00
Selected fill material, gravel	cy	350	6.00	4.00
Crushed rock	cy	350	6.00	5.00
Concrete, addl, Cl B	cy	150	60.00	60.00
Cl C	cy	100	60.00	50.00
Cl D	cy	100	25.00	20.00
Steel, reinf, addl	lb	30,000	0.125	0.10

Time schedule: start 8-8-55, complete 450 calendar days
Liquidated damages: $100 per day

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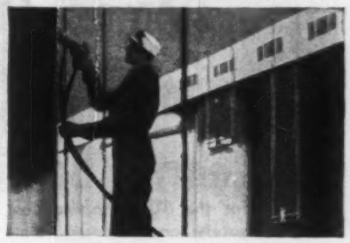

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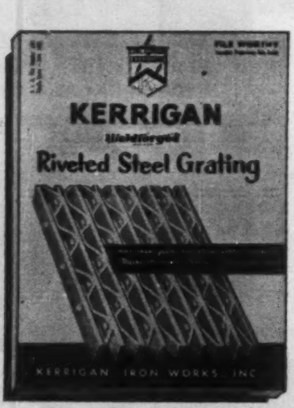
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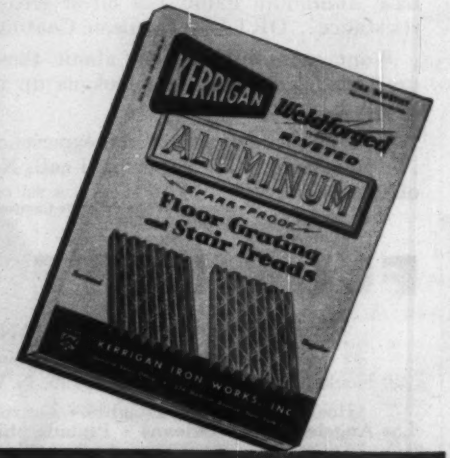
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Airports

Runway and Lighting for Portland Airport, Maine

A new 5,000-ft E-W runway and access taxiways for the Portland, Maine municipal airport will cost $883,081 for clearing, grading and paving, $44,158 for turfing and $37,184 for lighting. Seelye, Stevenson, Value & Knecht, New York are the consulting engineers.

The main contract to American Paving Co. of Meriden, Conn. is for a 150-ft x 5,000-ft runway and 60-ft x 5,875-ft of taxiway. The bituminous concrete pavement surface course is 2 ft 2 in, the base course of dry macadam is 8 & 9 in and the sub base course of selected material is 15 and 18 in.

The contract for hi-intensity R/W lighting and medium-intensity T/W lighting includes a new control vault in the administration building.

The turfing contract provides for 53 acres of intensive turf and 45 acres of non-intensive turf.

Wages range from $1.50 for common labor to $3.20 for skilled men.

Bidders include:

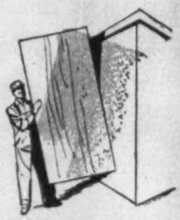
New East-West Runway

1C	American Paving Co., Meriden, Conn	$883,081
2	W. H. Hinman Inc., Portland, Maine	1,134,548
5	H. E. Sargent, Stillwater, Maine	1,365,195
EE	Seeyle, Stevenson, Value & Knecht, N. Y.	1,125,767

Bids: 5-27-55 Items	Unit	Quantity	Unit Prices 1C	 2
Clear & grub	ls	job	$26,300	$60,000
Clear	ls	job	2,000	8,000
bldgs & misc struct	ls	job	1,500	6,000
Remov exist pave	sy	7,500	0.20	1.00
Barricades, gate & transition road	ls	job	2,600	5,300
Remov exist drain struct	ls	job	250.00	1,700
Excavation, uncl	cy	651,700	0.41	0.58
Subbase course	cy	54,430	1.58	1.20
DB Macadam base	cy	28,575	5.35	6.00
Bitum surface, 2½"	ton	16,840	7.43	7.50
material for surf	gal	259,340	0.15	0.12
prime coat	gal	48,580	0.16	0.16
seal coat	gal	24,060	0.16	0.16
Cover aggr for seal	ton	721	3.15	5.00
Notch & scor or remov exist bit surf	sy	4,505	0.10	0.60
Overlay pave, drybound macadam base	cy	350	6.00	6.50
bit prime	gal	525	0.18	0.30
surf	ton	1,155	8.00	8.00
matl for surf	gal	17,770	0.16	0.12
tack coat	gal	820	0.16	0.25
seal coat	gal	1,640	0.16	0.25
Cover agg for seal	ton	49	3.50	6.00
RCP 12"	lf	2,511	nb	5.00
CMP 15"	lf	2,511	3.73	nb
RCP 15"	lf	800	nb	4.00
CMP 18"	lf	800	4.01	nb
RCP 18"	lf	2,400	nb	6.00
CMP 21"	lf	2,400	4.34	nb
RCP 24"	lf	4,023	nb	10.00
CMP 30"	lf	4,023	6.26	nb
RCP 30"	lf	1,532	nb	11.50
CMP 36"	lf	1,532	9.32	nb
RCP 42"	lf	80	15.50	22.00
RCP 30" incl pave replace	lf	858	9.00	20.00
6" subgr drs, perf VCP x str	lf	14,115	1.75	1.80
Porous backfill no. 2	cy	5,100	1.75	5.50
VCP 6"	lf	280	3.00	2.60
VCP 12"	lf	200	4.00	5.50
Swale inlet	ea	11	175.00	450.00
Swale inlet	ea	3	200.00	1,200
Inlet MH	ea	3	200.00	1,000
Catch basins	ea	22	175.00	350.00
Basin MH	ea	20	175.00	450.00
Subgrade drain MH	ea	10	175.00	400.00
Ordinary subgr dr MH	ea	16	175.00	375.00
Manhole	ea	1	200.00	2,500

Continued on following page

No costly re-coating between pourings



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Leaves concrete clean, smooth . . . ready for decorating

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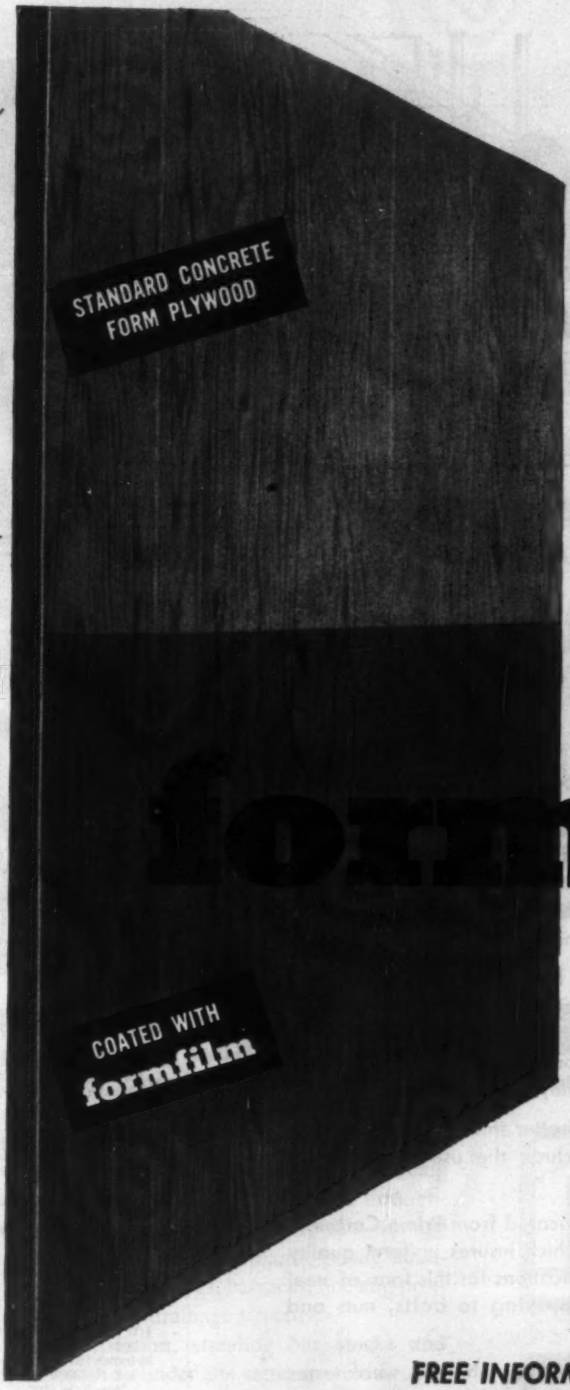

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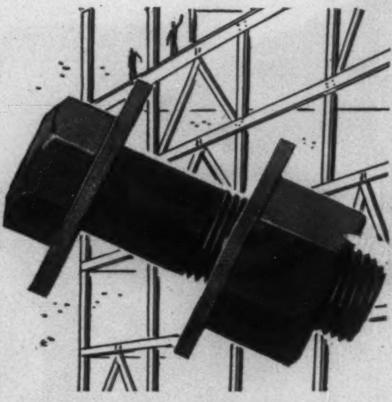
Because . . .

NO BOLT is ANY BETTER THAN ITS WASHERS



It pays to Specify **MIL-CARB*** CARBURIZED **WASHERS**

*TRADE MARK

for STRUCTURAL STEEL FRAMING

Today the swing in field assembly of structural steel joints is definitely toward *High Strength Bolting.* According to competent authorities who have had practical experience with this form of construction and evaluated its benefits, it is possible to *build better* and *build faster* by employing this method of joining steel members.

A primary essential, of course, is to use heat-treated, quenched and tempered bolts to produce a minimum ultimate strength of 120,000 psi for the usual size of bolt. At the same time, nuts must meet a proof load equivalent to the ultimate load of the bolts . . . *and the washers must be hardened, special quality steel.*

And because no bolt assembly is any better than its washers, consistent high-strength bolting should include the use of MIL-CARB Carburized Washers.

MIL-CARB Carburized Washers are fabricated from Prime Carburizing Quality Special Soundness Steel, which insures uniform quality control, always equal to the rigid specifications for this form of steel assembly (ASTM Designation A325, applying to bolts, nuts and washers).

Additionally, MIL-CARB Washers overcome inherent weaknesses often present in heat-treated washers fabricated from steel of questionable quality.

For uniformly sound construction specify MIL-CARB Carburized Washers

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WROUGHT WASHER MANUFACTURING CO.

The World's Largest Producer of Washers

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WROUGHT WASHER

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Portland Airport, Maine

Continued from preceding page

Items	Unit	Quantity	Unit Prices 1C	2
Manhole	ea	2	200.00	550.00
Exten exist MH	ea	1	200.00	250.00
Raise exist MH fr & covs to new fin grade	ea	4	100.00	70.00
Conn to exist MH under txwy over pave	ea	1	300.00	125.00
Remove fr & cov & repl with new fr & inlet grat for MH	ea	1	75.00	125.00
Concrete HW no 1	ea	1	200.00	1,200
HW no 2	ea	1	200.00	1,200
HW no 3	ea	1	200.00	800.00
Rubble ditches	sy	400	6.00	4.00
Undergr airport ducts 2–3"	lfb	1,065	3.00	3.70
4–3"	lfb	330	5.15	5.50
6–3"	lfb	140	7.30	7.00
8–3"	lfb	75	9.40	8.50
under exist pave, 2–3"	lfb	170	8.00	7.00
6–3"	lfb	170	15.00	9.00
Undergr				
elect pwr ducts 4–4"	lfb	1,125	4.50	7.00
telephone ducts 2–4"	lfb	1,125	3.00	5.00
2–compart elect & teleph MH	ea	4	600.00	1,500
R/W & T/W pave painting	ls	job	2,000	2,000
Conc for cradles under drain lines, unit price only	cy	.....	20.00	25.00

*lfb lineal feet of bank   *nb no bid

Turfing

1C	Transit Sodding Co., Hyde Park, Mass	$44,158
2	W. H. Hinman Inc., Portland, Maine	48,329
3	P. Rando & Co., Portland, Maine	68,205

Bids: 5-27-55

Items	Unit	Quantity	Unit Prices 1C	2
Prep ground surf type A	acre	64	$40.00	$100.00
type B	acre	39	40.00	80.00
Liming, type A	acre	64	12.00	45.00
type B	acre	39	12.00	45.00
Fertilizing, type A	acre	64	40.00	75.00
type B	acre	39	25.00	50.00
Sowing seed, type A	acre	69	115.00	100.00
type B	acre	39	97.50	80.00
Mowing, type A (3 mowings)	acre	192	20.00	12.00
Refertilizing, type A	acre	64	25.00	35.00
Reseed, type A	acre	10	115.00	100.00
type B	acre	10	97.50	80.00
Repairing	cy	300	3.50	6.00
Mulching	acre	103	135.00	80.00
Sodding	sy	510	1.98	2.00

Lighting: High Intensity Runway Medium Intensity Taxiway

1C	Kerr Electric Co., Auburn, Me	$37,184
2	Electric Service Co., Auburn, Me	44,658
5	Milliken Bros. Inc., Portland, Me	56,501

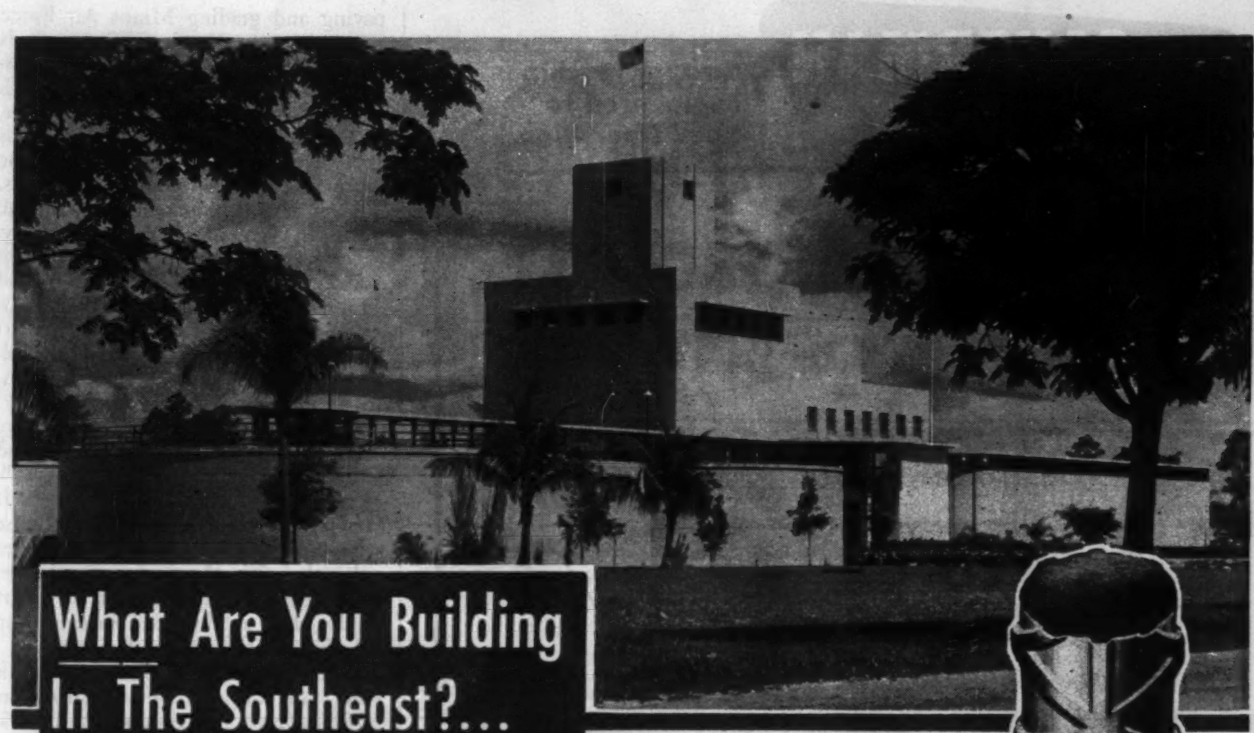
Bids: 5-27-55

Items	Unit	Quantity	Unit Prices 1C	2
New hi intens A/P elev marker, base mounted, f&i	ea	60	$145.58	$159.00
New A/P elev marker lts—column mtd, f&i	ea	147	62.30	72.00
All work in exist admin bldg, taxiway sys	ls	job	2,986	2,397
All other	ls	job	3,421	6,649
Underor cabl in duct, new f&i 1/C #8 3000V,				
new T/W circ	lf	5,500	0.13	0.21
exist circuits	lf	1,600	0.14	0.36
1/C #8 5000V, new R/W circ	lf	1,550	0.23	0.31
in trench f&i				
1/C #8 3000V				
new T/W circ	lf	20,500	0.12	0.14
exist R/W circ	lf	1,000	0.19	0.36
exist obstf lt & other circ, incl reconnectns	lf	1,500	0.18	0.26
5000V, new R/W circ.	lf	14,000	0.22	0.24
Trench, BF & restor surf				
New T/W circuits	lf	13,800	0.21	0.24
New R/W circuits	lf	10,600	0.21	0.24
Rerout exist circuits	lf	1,500	0.21	0.24
Disconn exist bound lt circ & reconn exist isol transf for obstr lts to exist R/W circ	ls	job	150.00	80.00

*f&i furnish and install   *BF backfill

Jet Airfield Paving and Fuel Storage, Minot, No. Dak.

A base bid plus "additive" features "to be included in contract provided sufficient funds are available" broke the bidding into nine schedules which added up to the $3,643,339 contract awarded Peter Kiewit Sons' Co. for



What Are You Building In The Southeast?...

CONNORS WILL PUT THE STEEL ON THE JOB WHEN YOU NEED IT!

Southwest Water Supply System Plant, Miami, Fla.
Another construction job on which Connors furnished the reinforcing bars.

Whatever the nature of your Southeastern construction project, you want it to proceed as swiftly and smoothly as possible.

That means you want Connors to supply the reinforcing steel.

Connors is currently supplying reinforcing steel for a wide range of building projects throughout the Southeast, including hospitals, sewage disposal plants, water filter plants, public buildings, apartment buildings, barracks, housing projects, schools, and drainage structures.

Central location, standing bar stocks and fabrication shop under the same roof with mills enable Connors to provide exceptional service to all customers in the Southeast.

CONNORS PRODUCTS: Reinforcing Bars • Merchant Bars • Structural Shapes • Hot Rolled Strip • Studded T Fence Posts • Highway Sign Posts • Bulb Tees • Special Sections

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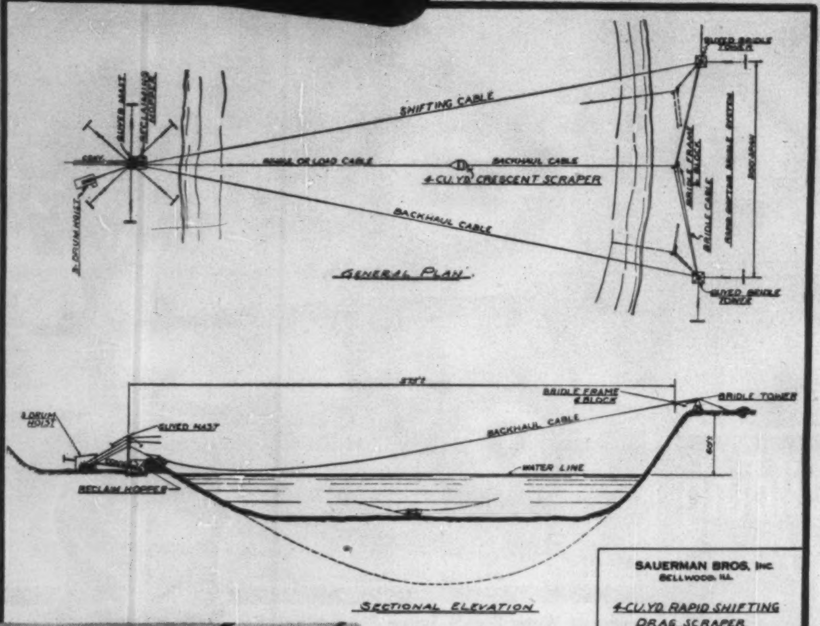
Scraper Machines Engineered to Your Operation



Above drawing was prepared for a specific drag scraper installation and does not represent maximum spans.

View shows rapid shifting bridle frame and all operating cables. Crescent may be seen in background conveying load to reclaiming hopper just in front of mast.

•

Contact Sauerman's engineering department for specific recommendations and information. No obligation.

Ask for Catalog A, Drag Scrapers—24 pages of job photos and specifications. Request Field Reports showing your material being handled by the low cost Sauerman Method.

The Sauerman Method works equally well over widely differing areas and span limits . . . on hills, swampy ground or underwater . . . handles any material a dragline can dig.

Every scraper machine is powered by a Sauerman Roller Bearing Hoist, especially designed to withstand sudden shocks and changes in speed.

When a rapid shifter is used, a third hoist drum is added to shift the bridle frame. The rapid-shifting bridle system (upper right of drawing) permits frequent shifting of the scraper's line of operation in non-caving material, shallow excavations or overburden.

Operating costs are lower—basically, it is cheaper to drag material than it is to lift and transport it. You eliminate the power costs of moving heavy machinery about the area. You pay only for pay loads—not dead weight. When expendable parts—sheaves, clutch or brake linings—are replaced, the machine is restored to practically new condition.

Sauerman can help you select the method of materials handling most profitable for your job—a system that will give you the lowest cost per cu. yd. handled.

SAUERMAN BROS. INC.
632 S. 28th AVE. BELLWOOD, ILL.

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

paving and grading Minot Air Force Base, Minot, North Dakota. Bids June 21 were taken by Omaha District, Corps of Engineers. Henry C. Ranspot is assistant resident engineer.

The base bid included alternate bids on flexible and rigid pavement and the 2-way and 4-way alternates on culverts. The successful bidder bid only on the flexible pavement alternate. Runway, taxiway and aprons involve about 2,462,600 cu yd of excavation and 115,900 cu yd of concrete pavement, or 32,500 cu yd of concrete pavement and 211,700 sq yd of flexible pavement and 1,100 lin ft of culverts 15 in. to 48 in.

Jet fuel storage facilities involve dikes including impervious fill and surface treatment, two 5,000-gal bulk storage tanks and a 32 ft by 16 ft concrete block transfer pumphouse with piping and equipment. The dikes are included in the unit prices shown, but the other elements of this part of the work are included in the lump sum bid for the jet fuel facilities.

Minimum wage rates posted for this work include, per hour: carpenters $2.28, ironworkers, reinforcing $2.825, laborers $1.57, bulldozer operators $2.30, truck drivers $1.65 to $1.90.

Bidders include:

1C	Peter Kiewit Sons' Co., Sheridan, Wyo....	$3,643,339
2	Morrison-Knudsen Co., Inc., & McCormick-Erling Co., Seattle, Wash................	3,813,582
6	S. J. Groves & Sons Co., Minneapolis, Minn.	4,706,099
EE	Omaha District Corps of Engineers........	4,074,348

Alternate base bid totals (including culverts)

	Flexible Pavement	Rigid Pavement
1C.................	$2,655,192	no bid
2..................	2,932,854	$3,729,105.89
3 Tecon Corp, Dallas.	2,967,265	4,032,878.55

Time schedule: work to start 10 days after award, to be completed in 420 days. Completion date Aug. 23, 1956.

Bids: 6-21-55 Items	Unit	Quantity	Unit Prices 1C	 2
Site, clear & grub.......	ls	job	$11,500	$17,500
Flexible pavement with Rigid pavement end sections on R/W				
Excavation..............	cy	1,860,000	$0.25	$0.31
Conc pavement, 16".....	cy	14,800	13.25	12.70
10".....	cy	2,380	13.25	12.70
Cement for conc pave...	bbl	25,800	6.50	6.20
Granlr filter crse 4".....	sy	263,000	0.25	0.36
Select matl subbase 38".	sy	209,000	2.10	2.54
48".	sy	11,300	2.70	3.22
52".	sy	34,800	3.00	3.48
58".	sy	8,840	3.30	3.85
Sub-base crse—35 CBR				
20".....	sy	201,000	1.50	1.80
28".....	sy	5,820	2.10	2.52
11".....	sy	11,300	0.80	1.00
Base crse 80CBR 6".....	sy	213,000	0.89	1.00
Stabiliz aggr base crse for blast paving.......	sy	14,700	0.60	0.79
Surface course..........	ton	17,600	7.70	5.40
Binder course...........	ton	26,100	7.70	5.40
Bit tack coat...........	gal	40,600	0.16	0.17
prime coat..........	gal	66,700	0.16	0.16
material............	gal	596,000	0.14	0.15
Elect ducts, 4" x 4-way..	lf	4,740	8.00	8.10
4" x 12-way.	lf	95	18.00	18.00
4" RS conduit.........	lf	130	3.00	3.10
Rigid pavement				
Excavation..............	cy	1,861,159	no bid	0.31
Conc pavement, 16".....	cy	54,900	nb	9.00
15".....	cy	42,400	nb	9.00
10".....	cy	5,340	nb	9.00
Cement for conc pave...	bbl	154,000	nb	6.20
Granlr filter crse 4".....	sy	263,000	nb	0.36
Select matl subbse 38"..	sy	5,820	nb	2.54
52"..	sy	130,000	nb	3.48
53"..	sy	106,400	nb	3.52
58"..	sy	20,100	nb	3.85

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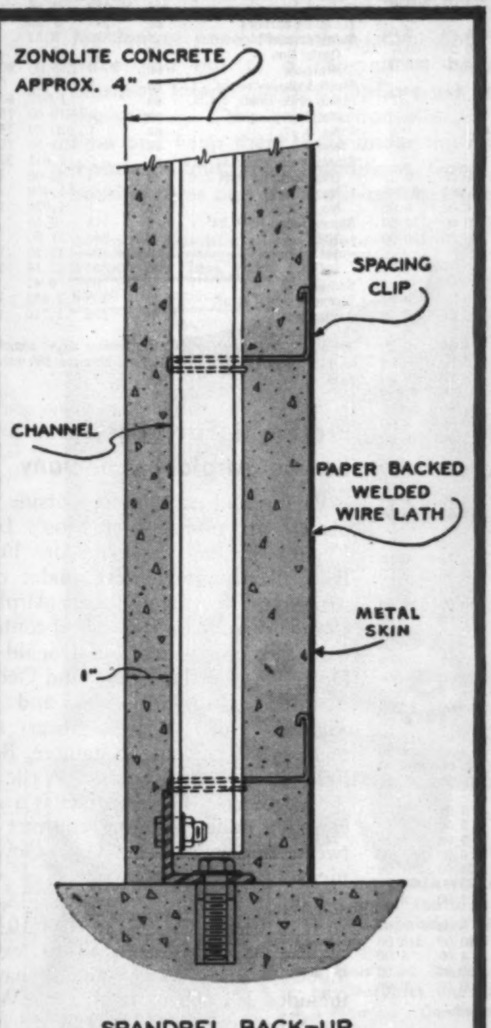
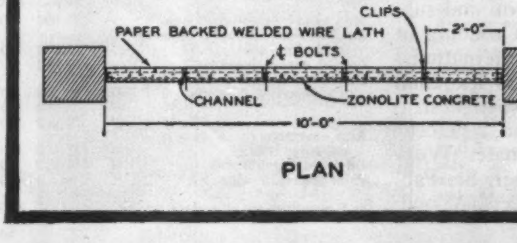
Amazing New "THIN-WALL" System Earns 5-Hour Rating

SPEEDS CONSTRUCTION—CUTS COSTS


ZONOLITE CONCRETE
APPROX. 4"
SPACING CLIP
CHANNEL
PAPER BACKED WELDED WIRE LATH
METAL SKIN
1"

SPANDREL BACK-UP


CLIPS
2'-0"
PAPER BACKED WELDED WIRE LATH
℄ BOLTS
CHANNEL
ZONOLITE CONCRETE
10'-0"

PLAN

Machine Placed

ZONOLITE®

CONCRETE

Provides All These Advantages

- **INSULATION**
- **FIRE SAFETY**
- **WIND RESISTANCE**
- **ECONOMY**
- **EASE OF APPLICATION**

Now for the first time, you can specify a spandrel or panel wall WITH A 5-HOUR FIRE RATING and at the same time achieve tremendous savings through weight reduction and rapid machine application. It's the new Zonolite vermiculite "THIN WALL."

The 5-hour rating was awarded in August, 1954, by Underwriters' Laboratories to a vermiculite concrete spandrel wall. This exceeds the rating of *any other* spandrel wall back-up. The vermiculite spandrel panel provides good insulating properties and has a 30 lb. per square foot wind pressure, more than adequate for multi-story building construction. Machine-placing cuts working time to a minimum.

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ZONOLITE Company, Dept. ENR-95
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Please send me free kit detailing amazing new "THIN WALL" system which earned Underwriters' 5-Hr. rating.

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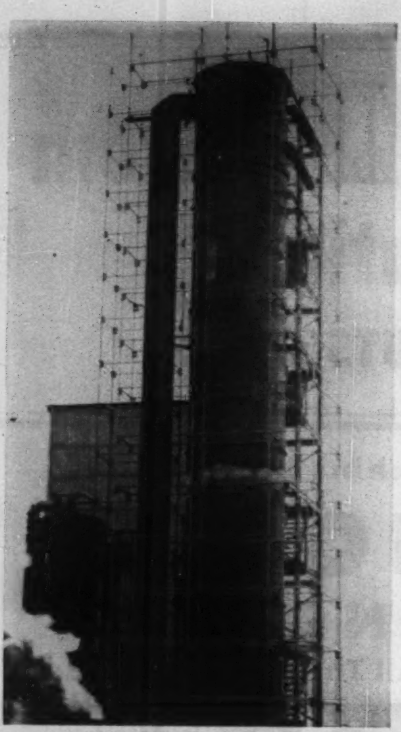
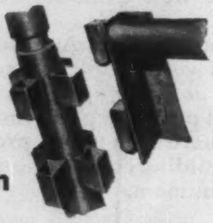


RIGID, SAFE SCAFFOLDING

that goes up fast with

NO X-BRACES
NO TOOLS
NO FASTENER PARTS

because of this simple, fool-proof, easy-to-join



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Erects easily over machinery, around piping, in congested areas, inside or outside any shape structure. As easily dismantled; stores compactly in narrow space. All standard parts will go through a 10" opening. Withstands extremely heavy loading.

Only eight different regular parts—no small parts for time-killing tinkering. This scaffolding can be erected as fast as the members can be slipped together. Holds planking any spacing, any direction. Economical to erect and dismantle for even those pesky short jobs in difficult places.

For real cost-saving from any angle—labor, time, safety, storage and maintenance—investigate SWISS-LOK utility or permanent scaffolding. Write for literature and prices, outlining your scaffolding needs.

SWISS FABRICATING, INC.,
2807 Camp Horne Road
Emsworth, Pittsburgh 2, Pa.
WEllington 1-2646

Jet Airfield, No. Dak.

Continued from preceding page

Bids: 6-21-55

Items	Unit	Quantity	Unit Pries 1C	2
Subbase crse 35 CBR	sy	5,820	nb	2.62
Stabiliz aggr base crse for blast paving	sy	14,700	nb	0.79
Bit prime coat	gal	3,910	nb	0.24
Surface course	ton	2,000	nb	10.80
Bit matl	gal	27,800	nb	0.19
Elect ducts, 4" x 4-way	lf	4,740	nb	8.10
4" x 12-way	lf	95	nb	18.00
4" RS conduit	lf	130	nb	3.10

Culverts

Items	Unit	Quantity	1C	2
42" ESRCP, 51" x 31" ESCRP arch, 48" bit ctd CMP, or 58" x 36" bit ctd CMP arch, optional	lf	1,135	22.00	21.60
End sections for same	ea	2	275.00	162.00
42" SSRCP or 48" bit ctd CMP, optional	lf	60	21.00	19.20
End sections for same	ea	1	275.00	162.00
Flap gate	ea	1	275.00	300.00
15" EXRCP or 15" bit ctd CMP, optional	lf	505	5.00	6.00
End sections for same	ea	2	50.00	60.00
Topsoiling	acre	510	140.00	210.00
Res engr office, incl all temp suppt facil	ls	1	15,000	11,000

Additive items (if funds available) Included in contract

Items	Unit	Quantity	1C	2
Excavation	cy	570,500	0.25	0.22
Numbering and marking	ls	job	9,000	10,000
Temporary seeding	acre	573	4.00	6.00
protection	acre	573	20.00	24.00
Permanent seeding	acre	573	100.00	120.00

Operational parking apron

Items	Unit	Quantity	1C	2
Excavation	cy	5,478	0.30	0.34
Conc pavement	cy	9,683	13.25	9.50
Cement for conc pavement	bbl	14,500	6.50	6.20
Granlr Fltr crse 4"	sy	23,257	0.30	0.36
Select matl subbse crs 52"	sy	23,257	3.25	3.50
Pip'g & elect duct, refuel	ls	job	15,000	6,000
Elect receptacle system	ls	job	5,500	5,000
Tie-down anchors	ea	25	10.00	4.80
Topsoiling	acre	12	140.00	210.00

Hangar access apron & taxiways

Items	Unit	Quantity	1C	2
Excavation	cy	25,530	0.30	0.34
Concrete pavement	cy	3,776	13.25	9.50
Cement for conc pavement	bbl	5,660	6.50	6.20
Granlr filtr crse 4"	sy	10,187	0.30	0.36
Selct matl subbse crs 54"	sy	10,187	3.50	3.60
Water pipeline under pavement, 10"	lf	190	10.00	6.00
Topsoiling	acre	9	140.00	210.00

Jet fuel storage facilities

Items	Unit	Quantity	1C	2
All except items below	ls	job	110,000	110,000
Imperv fill, grav surf & surf treat	ls	job	10,000	2,200
Excavation	cy	100	1.00	3.60
Spot subgrd reinforce	cy	100	5.00	6.00
Ch link fence blk strge	lf	766	5.00	4.90
gates	ea	2	150.00	205.00
Conc pavement, 11"	cy	4,710	19.25	[illegible]
Cement for conc pavement	bbl	7,070	6.50	6.20
Granular filter course	cy	5,270	3.50	3.60
Storm drains, 12" CP	lf	155	5.00	4.20
15" CP	lf	660	6.00	4.80
Manholes, Type C	ea	2	425.00	264.00
Inlets	ea	6	175.00	156.00
Perf pipe subdrains	lf	2,631	4.00	2.75
Water pipeline under pavement, 6"	lf	75	8.00	6.00
Topsoiling	acre	9	140.00	210.00
Seeding, temporary	acre	9	4.00	6.00
Protection, temporary	acre	9	20.00	24.00
Seeding, permanent	acre	9	100.00	120.00

*ES extra strength *SS standard strength

Aircraft Parking Apron and Drainage, Minnesota

At $384,134 the low bidder for the AFRTC apron paving, storm and subdrain system, grading and sodding at the Minneapolis-St. Paul International Airport in Minneapolis was less than one percent under the next highest, 6 percent under the high and 7 percent below the engineers' estimate. Work is for the District Engineer, St. Paul District, Corps of Engineers. Woodrich Construction Co. is the successful contractor.

Concrete, proportioned by weight, must test at 3,000 psi at 28 days.

Minimum wages certified for the job include: carpenters $2.80, laborers $2.05-2.755, ironworkers, reinforcing $2.87, truck drivers $2.05.

Bidders include:

	Bidder	Amount
1C	Woodrich Construction Co., Hopkins, Minn.	$384,134
2	Anderson & Sons, Minneapolis, Minn.	385,957
3	S. J. Groves & Sons Co., Minneapolis, Minn.	409,214
EE	St. Paul District Engineer; Corps of Engineers, St. Paul, Minn.	414,669

Bids: 6-28-55

Items	Unit	Quantity	Unit Price 1C	2
Excavation	cy	27,700	$0.62	$0.60
Rigid pave, base crse	t	15,300	2.03	2.00
Granular filter course	t	7,800	1.87	1.80
Concrete pavement	cy	12,320	11.45	12.40
Cement, conc pave	bbl	16,950	4.16	4.00
Tie down anchors	ea	281	7.20	5.50
Subdrain perf pipe	lf	1,530	3.32	3.50
Outlet line	lf	120	2.10	2.00
Manhole	ea	3	525.00	500.00
Flush & observ risers	ea	2	52.50	50.00
Storm drain inlets, No. 6	ea	1	1,070	900.00
No. 7	ea	1	810.00	750.00
No. 8	ea	1	920.00	786.00
No. 9	ea	1	735.00	700.00
Storm drain MH Nos. 2, 3	ea	2	1,645	506.00
Overdepth for MH 2, 3	vf	4	42.00	18.60
No. 4	ea	1	1,400	1,475
No. 5	ea	1	1,020	1,500
Storm drains RCP, 24"	lf	115	9.65	8.60
30"	lf	260	11.60	10.88
36"	lf	1,120	15.20	14.86
48"	lf	2,300	22.15	24.00
Sodding	sy	22,700	0.42	0.40
Storm dr outlet struct	ls	Job	7,952	1,800
Topsoiling	ls	Job	1,710	1,650

Time schedule: start, within 10 calendar days; completion in 135 calendar days. Liquidated damages $50/calendar day.

Pre-flight Facilities for Boeing Airplane Company

Paving and utilities for outside airplane work positions at Moses Lake Flight Center, Larson Air Force Base, Washington, went under construction July 11 for Boeing Airplane Company under a $1,218,000 contract with the joint venture of Donald M. Drake Co., Portland, Ore. and George A. Fuller Co., New York and Los Angeles. This tops the engineers' estimate by 15 percent. Naramore, Bain, Brady & Johanson, Seattle, Wash. are the engineers. This contract is a subcontract under a prime contract between Boeing and the U. S. Government.

Concrete paving includes 38,500 sq ft of 6½-in, 800,000 sq ft of 10½-in, 20,000 sq ft of 15-in, all to test at 4,000 psi. Asphaltic concrete paving includes 231,000 sq ft of 2-in. Work must be completed in 124 calendar days. Highway transportation is available. The job is 5 mi from railhead.

Work involves:

Item	Unit	Quantity	Unit Price
Strip topsoil, deposit spoil area	cy	180,000	$0.42
Machine excav, deposit & compact as fill within area	cy	25,000	0.38
Borrow, deposit & compact	cy	70,000	0.50
Conc pave, 3" base course, 2" top crse, dowels & jt sealing, 6½"	sf	38,500	0.44
10½"	sf	800,000	0.65
15"	sf	20,000	0.88
Asph conc pave, incl 3" base crse, and 2" top crse	sf	231,000	0.16
Oil on dust control area	sf	474,000	0.01
Paint striping, 6" wide	lf	no est	0.25

sq ft quantities are all surface measurements

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MORRISON International CampCars cut travel, housing, man-hour costs . . . KEEP YOU COMPETITIVE!

No longer need mounting travel and housing costs price you out of a competitive bidding position. Morrison International CampCars put your crews on-the-spot . . . the construction site . . . in minimum time and keep them there under the most favorable, morale-building living conditions. Gone are the costly housing rates and the profit-cutting travel allowances.

Actually, CampCars can house 8 men for less than the hotel allowance for 1!

CampCars are built to withstand rough off-highway travel as well as the thousands of tow-miles expected of them. They are fully insulated to withstand the most extreme outside temperatures, resist weather deterioration and are provided with safety features on all utility and sanitary equipment to assure safe, trouble-free use.

COMBINATIONS OF UNITS WILL ACCOMMODATE ANY SIZE CREW. Self-containment features make it possible for 2 to 50 or more men to live entirely independent of utilities and servicing for a week to 10 days.

SIX STANDARD MODELS TO CHOOSE FROM

- 8 Man . . . Dormitory with Complete Sanitary Facilities and Shower
- 8 Man . . . Combination Kitchen, Dining and Recreation Car
- 2 to 5 Man . . . Complete Living Facilities
- Complete Kitchen Car with Living for 2
- Dining and Recreation Car accommodates up to 22
- Office and Tool Car with Living for 2

Special Interior Layouts can be designed to suit your specifications

Designed and Manufactured by the Pioneer of Mobile Housing for Construction Crews

SHOWN UPPER LEFT: 8-man Dormitory CampCar showing 4 man-size bunks, with storage drawers and shoe lockers under bunks; also, enclosed dry chemical toilet.

SHOWN LEFT: 8-man Combination Cooking and Dining CampCar showing large dining and recreational area, plus 2 refrigerators, ample storage lockers and complete cooking facilities.

INTERNATIONAL EQUIPMENT DIVISION

MORRISON RAILWAY SUPPLY CORP.

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Forest Remover

A new machine . . . a new system . . . for economically converting wooded wasteland into productive earth

This is the LeTourneau TREE CRUSHER . . . a 110-ton steel monster whose heavy, cleated rollers crush big trees and thick undergrowth alike. It leaves a wake of splintered wood and compacted debris — ready for burning. Forest leveling by Tree Crusher is one of several new approaches to mechanized land clearing available in a line of specialized equipment manufactured by LeTourneau.

Land clearing with tremendously powerful machines is only one field for profitable industrial pioneering now being opened with BIG LeTourneau equipment — equipment which represents a totally new concept in machine design. This concept combines *mass, power,* and precise *control* in machines for the BIG JOBS of land development.

Key to the amazing effectiveness of this new machinery is the LeTourneau system of electric power application and control. With it, engine-generator sets located anywhere on the machine supply power for electric gearmotors *located wherever work is to be done.* Even the wheels are individually powered by motors and gear reductions inside their rims. Design restrictions and power waste of mechanical drives are eliminated, and *all* available engine power is applied where it's needed.

Today LeTourneau's massive, mobile, diesel-electric equipment is working in Africa, South America, Canada, Alaska and throughout the United States in many fields of off-road, big-job operation, including land clearing, logging, heavy materials handling and cross-country transportation. And LeTourneau has still newer, more exciting power applications ready for TODAY'S PIONEERS.

Write us today about your off-road operation problems and let us help you solve them. Or send for literature on standard LeTourneau equipment.

SINCE 1929 — R. G. LeTourneau, Inc., has built BIG equipment for 26 years under the same corporate structure. In 1953 LeTourneau sold part of its business, retaining plants in Longview, Texas, and Vicksburg, Miss. Today LeTourneau creates and produces electrically powered and controlled equipment for logging, land clearing, and off-road transportation.

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2729 S. MacArthur, Longview, Texas

LETOURNEAU LeT EQUIPMENT *Equipment*

C-186

Runway Extension for Seattle-Tacoma Airport

Clearing, grading, drainage, lighting and concrete paving for a 1,000-ft runway extension at the Seattle-Tacoma International Airport will cost the Port of Seattle $257,869 under a contract with Northwest Construction Co., Seattle, Wash. G. T. Treadwell is chief engineer for the Port of Seattle.

Work is to be completed in 120 calendar days with liquidated damages set at $200 per day. It includes a new water line of 6" 10-ga steel pipe dipped and wrapped according to AWWA specifications in a vertical bath of hot asphalt or coal tar enamel and wrapped in 23½# asbestos felt or equal.

Contractor cannot interfere with operation of existing runways during the course of the work.

Seattle wage rates include: carpenters $2.76, electrical workers $3.35, common labor $2.35, all including fringe benefits.

Unit contract prices include:

Bids: 6-15-55 Items	Unit	Quantity	Unit Prices
Clearing, structs, fences, trees, brush, fdns, septic tanks, walks, rocks, remov & cap utilities	ac	10*	$250.00
Excav, earth & surf gradg, cut	cy	189,100*	0.25
borrow	cy	143,300*	0.25
Grading, incl transp, compact, surf	ac	10	600.00
Conc pave, runway incl screeds & fine grading	sy	17,000	5.40
Cutting and re-pave, taxiway	ls	job	300.00
Instal drain lines, gutters, MH, CB	ls	job	17,044
Instal high-intensity lghts, & elec	ls	job	14,000
Soil conditiong, fert, roll, wtr, seed	ac	26.5*	900.00
Plant & misc	ls	job	6,000

* An alternate work area may be added to this contract at these prices.

Concrete specs require 5.5 sacks of cement/cy, 6 gal of water/94# sack of cement, and dry aggregate per sack: fine 213#-255#, coarse 368-380#, total 593#. Slump range 1½" to 2½"

Electrical work incl: install high intensity runway lights incl cables and connection to exist syst; temporary, then permanent relocation of threshold lights incl cables and connections· relocation of exist taxiway lights, installing of underground ducts and conduits

Rigid Taxiway on Oyster Shell Base, Houston, Tex.

The third taxiway connection to Houston's International Airport terminal area will cost $195,247, part of a 7-year, $8.2 million improvement program under the direction of J. M. Nagle, director, Department of Public Works, Houston, Tex. W. C. Lieb is design engineer.

Ramey Contracting Co. will build this 3,100-ft long, 75-ft wide pavement of 13-in reinforced concrete on 8 in of compacted sand stabilized oyster shell and compacted subgrade.

The unit price for concrete paving includes reinforcing, dowels, all joint materials except expansion joints. Expansion joints are 240 ft and 360 ft apart. Longitudinal steel is continuous between expansion joints, longi-

Continued on following page

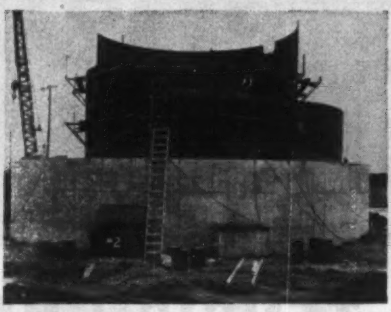
(*Advertisement*)

Prefabricated Form System Used For All Types of Construction

Saves Time . . . Labor . . . Material

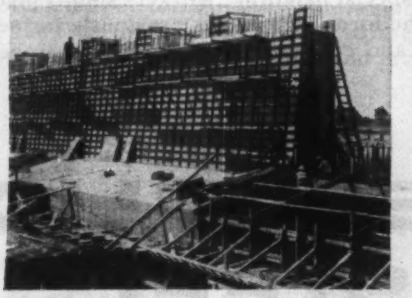
UNI-FORM Concrete forms are widely used in all types of concrete construction because they provide contractors with three important advantages: (1) Increased labor productivity — forming crews can erect more contact area per man hour; (2) Guaranteed material and labor savings and (3) Complete flexibility of application.

Simple mechanical assembly of plywood faced, steel-framed UNI-FORM Concrete Forms permits any labor force to become expert in a short time. All forming requirement — inside corners, outside corners, pilasters, one-side alignment and bracing, automatically accurate wall widths, scaffolding, etc. are engineered into, and provided with, the UNI-FORM System.



Circular wall formed with UNI-FORM Panels

Contractors using the UNI-FORM System have the basic equipment to handle any type of concrete construction. Complete engineering service . . . job analysis, forming recommendations, bills of material and forming details, together with field service are available to contractors through the manufacturer, Universal Form Clamp Co., Chicago, or through any of the company's many Distributor or Branch Offices.



Battered wall forming with UNI-FORMS

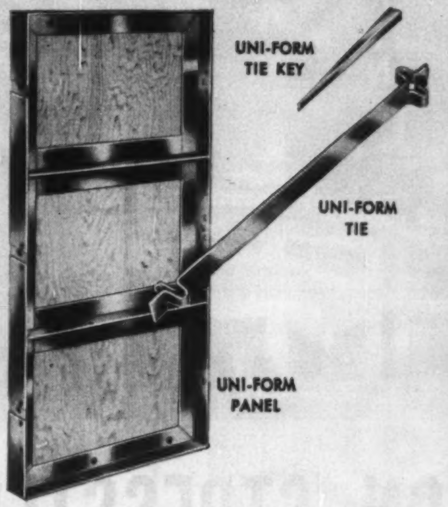
A complete catalog, describing the UNI-FORM System of Wall Form Construction is available upon request. Write: Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill.

UNI-FORM Concrete Forms

SIMPLE . . . FAST . . . FLEXIBLE

3 BASIC ELEMENTS mean

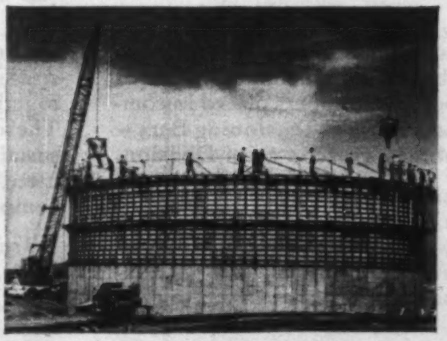
Faster, Easier, More Accurate Forming



Simple mechanical assembly of UNI-FORM Concrete Forms provides faster forming . . . easier stripping and lowest all around costs. Ready to use when they reach the job, UNI-FORMS guarantee time, material and labor savings on any forming job. Let us prove UNI-FORM advantages . . . send us a set of prints for free recommendation and proposal on your next job. There's no obligation.

FORM CIRCULAR WALLS AT LOWEST COST

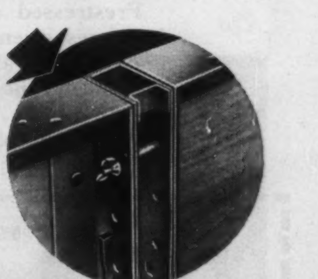
- **No alignment or bracing on outside.**
- **Minimum excavation required.**
- **Free working area.**
- **Maximum job safety.**



UNI-FORMING Circular walls costs less per square ft. of contact area . . . provides unhampered steel setting . . . greater control of concrete placement. Write for details on UNI-FORMING circular walls.

PREFABRICATED CIRCULAR WALL FILLER

Used on outside form only . . . assures true form curvature with standard UNI-FORM Panels.



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Downtown Center Parking Garage,
San Francisco, Cal.
Cahill Construction Co., contractors
George Applegarth, architect

SELF PARKING
SELF PARKING

TRUSCON STRESSTEEL TENSIONING NEW DOWNTOWN CENTER GARAGE

San Francisco's handsome new 9-story "self parking" garage is 'quake-resistant thanks to the added strength of its supporting members placed in compression by Truscon Stressteel Tensioning Bars—a product of Republic's Truscon Steel Division.

Prestressed concrete construction not only increases strength, but cuts deadweight, saves materials and allows longer spans. And, Truscon Stressteel Tensioning Bars now make prestressing practical . . . make prestressed concrete construction completely competitive with other types.

The patented Stressteel principle utilizes alloy steel reinforcing bars of extremely high strength, together with suitable anchoring assemblies. These alloy bars are fully capable of carrying the sustained high stress necessary to prestress concrete, and to place it in a permanent state of compression.

Truscon Stressteel Units require no special skills, no special handling. Workers simply place them in the form, or in holes previously formed in beams and columns. The bars are tensioned

REPUBLIC STEEL CORPORATION
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Please send me more information on:

☐ Truscon Stressteel Tensioning Bars
☐ Toncan Drainage Products
☐ Republic Plastic Pipe
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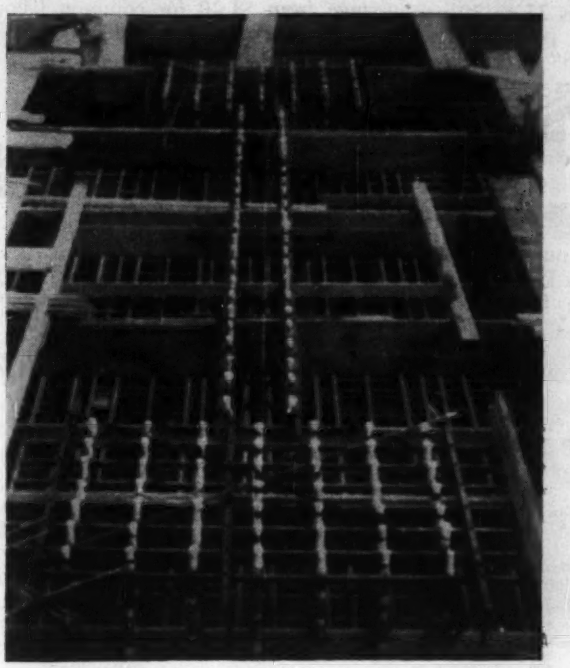
City__________ Zone____ State________
K-8550

REPUBLIC STEEL

Truscon Stressteel Tensioning Bars in place ready for concrete pour. Threaded ends protected by wrappings. After concrete has set, bars will be placed in tension by jacking and structure will be prestressed.



BARS HELP RESIST 'QUAKES

using hydraulic jacks. Depending upon length, Stressteel Tensioning Bars may be placed, stressed and anchored at the rate of 25 to 45 man-hours per ton of bars.

You can apply Stressteel advantages in bridges, building frames, dams, retaining walls, poles, piles, roof slabs, beams, bulkhead tiebacks, and to reinforce existing concrete structures. Write for more details on this interesting development, and for the Truscon Stressteel Manual listing applications, design data, specifications and procedures.

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL

REMEMBER REPUBLIC FOR MORE CONSTRUCTION PRODUCTS:

NEED TEMPORARY WATER LINES? No better way than with Republic Plastic Pipe. Use it anywhere. Just lay it on the surface, even around corners, pick it up later for re-use. Necessary connections are easily and simply made. Keep Republic Plastic Pipe handy on every job. Choose from three kinds: Flexible Polyethylene, Semi-Rigid Butyrate and Kralastic—all lightweight, tough and corrosion-resistant. Pipe distributors have them in stock for you.

PERMANENT DRAINAGE CALLS FOR TONCAN DRAINAGE PRODUCTS— Water runoff is efficiently handled by Republic Corrugated Metal Pipe Arch (above). It's made of Republic Toncan Iron, which contains both copper and molybdenum—is more rust-resistant than any other ferrous material in its price class. Toncan Drainage Structures resist the strains of shifting soil...resist the crumbling, cracking, spalling common to non-metallic products. It's lightweight and easy to assemble, easy to place. Names of Toncan Drainage Products manufacturers on request.

HIGH STRENGTH BOLTS COST LESS THAN RIVETS INSTALLED— Republic High-Strength Structural Bolts are faster, stronger and quieter than rivets. They don't need heating, so there's no fire and safety hazard. They're assembled with wrenches set at predetermined torques and the results are stronger, tighter joints. Bolts are made in accordance with ASTM Spec. A 325. Marked for easy identification to conform to Spec. for Assembly of Structural Joints, 2-27-54, Research Council on Riveted and Bolted Construction.

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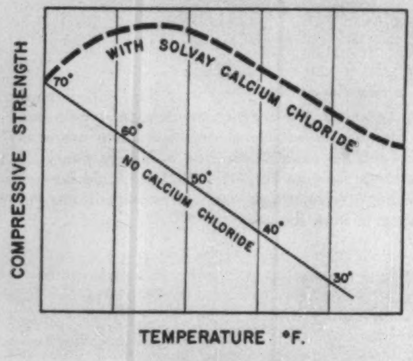
CALCIUM CHLORIDE KEEPS CONCRETE STRENGTH from DROPPING with the TEMPERATURE



The Addition of SOLVAY CALCIUM CHLORIDE to Concrete During Cold Weather . . .

- Speeds finishing
- Cuts delays between operations
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- Permits faster removal of forms
- Assures full strength

NEW 25 LB. BAGS FOR READY-MIX CONCRETE

SOLVAY
CALCIUM CHLORIDE
ABSORBS MOISTURE
ENDS DUST
ENDS SLIPPERY ICE
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Please send me—WITHOUT COST OR OBLIGATION:

☐ "When the temperature drops BELOW 50°F., do you know what happens to CONCRETE?"

☐ "The Effects of Calcium Chloride on Portland Cement"

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Rigid Taxiway, Texas

Continued from preceding page

tudinal construction joints are dowelled. Base material is 25 to 30 percent sand and 70-75 percent oyster shell, compacted to 8" in thickness with sheepsfoot rollers and finished with pneumatic rollers.

Concrete requires 5 sacks of cement per yard, 6.5 gal of water per sack, average beam strength of 650 lb/sq in at 7 days. Coarse aggregate is gravel.

Skilled wages top out at $3.125, semi-skilled range from $1.50 to $2.00 and common labor runs from $1.00 to $1.50.

The successful bidder was less than 2 percent under the engineers' estimate, over 2 percent under the second low, but almost 25 percent under the tenth and high bid. Bidders include:

1C Ramey Contr. Co., Amarillo, Tex.	$195,247
2 Gulf Bitulithic Co., Houston, Tex.	201,046
10 Gaylord Const. Co., Houston, Tex.	260,672
EE J. M. Nagle, Dir of PW, W. C. Lieb Des. Engr., Houston, Tex.	200,000

Bids: 6-1-55 Items	Unit	Quantity	Unit Price 1C	2
Remove inlet & pipe	ls	job	150.00	150.00
Conc pave	sy	170	1.40	1.75
Conc pavement, 7"	sy	170	4.20	5.00
Undrgrnd duct, sgnl split 4"	lf	160	5.15	3.18
4-4"	lf	344	6.18	6.48
6-4"	lf	400	7.73	9.28
Cable trench	lf	2,100	0.42	0.54
Cable in tr, No. 8 1/c 5000 V	lf	2,600	0.52	0.39
Hi inten lights, rem & inst.	ea	2	283.25	40.00
Flush lights, remove	ea	3	283.25	13.00
CP Sew, all depths,				
C-76, 24"	lf	430	5.30	6.45
C-14, 24"	lf	1,500	4.65	5.65
Std airport inlet, with pad.	ea	2	215.00	200.00
without pad.	ea	1	203.00	150.00
doub with pad.	ea	1	400.00	300.00
Excav, uncl	cy	14,000	0.39	0.25
Subgrade preparation	sy	25,950	0.02	0.15
Shell base, 8" comptd snd stbl	sy	25,950	1.13	1.43
RC pavement, 13"	sy	24,650	5.58	5.40
Expan jt, Type A	lf	600	1.50	1.75
Type C	lf	1,410	0.60	0.65
Extra labor	manhr	100	1.00	0.01

Time schedule: start 7-6-55, allowed for completion, 90 working days.

Bridges

I-beam Girder Bridges for West Virginia

The Amherstdale bridge in Logan County attracted 11 bidders including a low of $64,810. Fishers Ford Bridge in Morgan County drew five bidders with a low of $285,812, both considerably under the engineers' estimates. Both are for the State Road Commission, George W. McAlpin, state construction engineer. J. N. Wallace, district engineer, Huntington, is in charge of the Amherstdale bridge and Kenneth Dunn, district engineer, Keyser, W. Va., is supervising Fishers Ford.

Both structures require six bags of cement per yard and a crushing strength for concrete of 3,000 psi minimum. All materials are furnished by the contractors.

Amherstdale will have two 58-ft 6-in. simple steel I-beam girder spans with a roadway width of 24 ft. The job is right on the railroad. Wages range from $1.20 for common labor through $1.55 for semi-skilled to $1.95 for skilled labor.

Bidders include:

Amherstdale Bridge, Logan County, W. Va.

1C J. M. Francesa & Co., Logan, W. Va.	$64,810
2 Wallace Construction Co., Beckley, W. Va.	68,369
11 Agnew-Joseph Co., Ronceverte, W. Va	96,391
EE State Road Commission, Construction Division	79,359

Bids: 8-9-55 Items	Unit	Quantity	Unit Prices 1C	2
Excav, struct	cy	550	3.00	3.00
rock	cy	95	10.00	15.00
wet	cy	860	5.00	7.00
Concrete, superstr, Cl A.	cy	74.6	60.00	50.00
Cl B.	cy	875.1	35.00	33.50
Steel, reinforcing bars	lb	34,899	0.13	0.12
Dampproofing	sy	250	1.50	1.50
Steel, superstructure, 85t	ls	job	17,000	21,000
Sidewalk grating	sf	401	3.80	4.30

Time schedule: start 10 days after award
Complete 125 working days
No liquidated damages

Fishers Ford bridge will have two 73-ft 5 in. and three 92-ft continuous steel I-beam spans on concrete substructure and a roadway width of 26 ft. The job is on the B & O Railway. Wages range from $1.10 for common labor through $1.40 for semi-skilled to $1.85 for skilled.

Bidders include:

Fisher's Ford Bridge, Morgan County

Two 73'-5" and three 92' continuous I-beam spans on concrete substructure, also 1.308 mi of approaches, grading draining, asphalt concrete bottom and wearing courses

1C R. B. Gay & Co., Roanoke, Va.	$285,812
2 Dodd Construction Co.	287,580
5 Monty Bros., St. Albans, W. Va.	331,543
EE State Road Commission, Construction Division	345,427

Bids: 8-9-55 Items	Unit	Quantity	Unit Prices 1C	2
Excav, struct	cy	317	$3.00	$3.00
rock	cy	65	15.00	10.00
wet	cy	258	6.00	8.00
Piles, steel bearing	lf	556	8.00	7.00
Concrete superstr, Cl A.	cy	308	50.00	54.00
substr, Cl A.	cy	120	40.00	50.00
Cl B.	cy	571	37.00	44.00
railing	lf	855	7.00	7.00
Steel, reinforcing bars	lb	87,957	0.1175	0.12
Dampproofing	sy	122	1.50	1.50
Steel, superstructure, 250t	ls	job	69,000	74,000
Clear & grub	acre	23	200.00	50.00
Excav, uncl	cy	45,600	0.46	0.45
borrow	cy	40,000	0.46	0.45
Overhaul	Mstay	300	2.50	2.50
Excav, struct	cy	760	2.00	1.50
T B base, limestone	t	8,470	3.50	3.10
Prime coat, limestone	t	190	5.00	4.50
Bituminous material	gal	11,475	0.22	0.23
H L asph, c bottom, limestone	t	2,007	8.90	9.00
wearing, limestone	t	1,000	9.00	9.00
base crs, limestone	t	3,060	8.90	9.00
Sec plate pipe arch	lf	38	100.00	90.00
CMP, coated, 18"	lf	1,200	3.65	3.75
30"	lf	80	7.15	7.00
Concrete, Cl B	cy	32	38.00	50.00
Crushed stone, grav or sand	cy	42	10.00	5.00
Comb conc curb & gutter.	lf	60	3.00	5.00
Drop inlet casting	ea	2	30.00	40.00
complete, except casting	ea	2	250.00	150.00
Special rock fill	cy	3,980	1.50	1.00
Water for compaction	Mgal	60	5.00	8.00
Rip rap	cy	20	10.00	10.00

Time schedule: start within 10 days
Complete in 150 working days
No liquidated damages

Refurbishing the James River Bridge, Va.

Allowing four months for the job, the Virginia Department of Highways has let a $94,221 contract to Paint Products Co. for cleaning and painting the James River Bridge in Warwick and for cleaning and lubricating its lift span wire ropes.

The job includes the vertical lift span and towers, eight flanking truss spans, eight girder spans adjoining the main navigation channel, nine girder spans including the hump span over the secondary navigation channel, the exterior surfaces of the machinery houses, the truss span railings and ladders, in all 2,138 tons of steel in trusses and 800 tons in girders, a total of 2,938. Eight cables at each corner of the lift span account for 4,280 lin ft of 1⅝" cable to be cleaned and lubricated. Bids ranged from $600 to $3,500.

The four bidders estimated the job as follows:

Bidder: 6-15-55	Total Amount Painting	Cl & Pt Bridge $/ton	Clean & Lub Rope $/lin ft
Paint Products Co, Newport News, Va	$94,271	$31.54	$0.374
P N Spanos & Co Inc, Wheeling, W. Va	99,670	33.72	0.14
Universal Maint & Painting Co Pittsburgh, Pa	111,820	36.87	0.82
The Geo Tarbuk Co Inc, Midland, Pa	126,564	......	......

Plate Girder Underpass Duluth, Minnesota

The 75-ft through plate girder underpass of D M & I R Railway double track at Thompson Hill, Duluth, to cost $199,470, will be built by W. V. Roedter Construction Co. of Duluth for the State Highway Department, A. E. LaBonte, bridge engineer.

Work is to be completed March 15, 1956, but liquidated damages of $50 per day do not start until December 1, 1956 because this bridge is to serve iron ore hauling from the mines and special conditions in the contract require that there be no interruption of hauling during construction. Rail, highway and water transportation are all available to the site.

Wages to be paid range from $1.60-2.55 for common labor, from $1.95-2.65 for intermediate grades and from $2.30-3.15 for skilled trades.

The six bidders on this job and the bidding include:

1C	W. V Roedter Constr. Co., Duluth, Minn	$199,470
2	Brogan Construction Co., Des Moines, Iowa	248,683
6	Polaris Concrete Products Co., Duluth, Minn.	368,253

Bids: 8-5-55 Items	Unit	Quantity	Unit Price 1C	2
Excavation, Cl U	cy	2,500	$2.00	$7.00
Concrete, mix 1A6	cy	537	30.00	48.00
3Y6	cy	1,466	41.00	50.00
Steel castings, grade 70-36	lb	16,780	0.55	0.50
Sheet lead	lb	425	1.00	1.00
Standard name plates	ea	2	50.00	50.00
Structural steel	lb	311,940	0.20	0.24
Reinforcement bars	lb	130,030	0.15	0.13
3-ply joint waterproofing	lf	365	1.50	3.00
Wrought bronze	lb	685	1.50	2.00
Remove old struct, temp bents	ls	job	100.00	3,000
Cl C excavation	cy	8,500	2.00	1.65
Steel, struct phos-chrom	l	27,730	0.25	0.25
Selected back fill	cy	1,000	1.00	5.00

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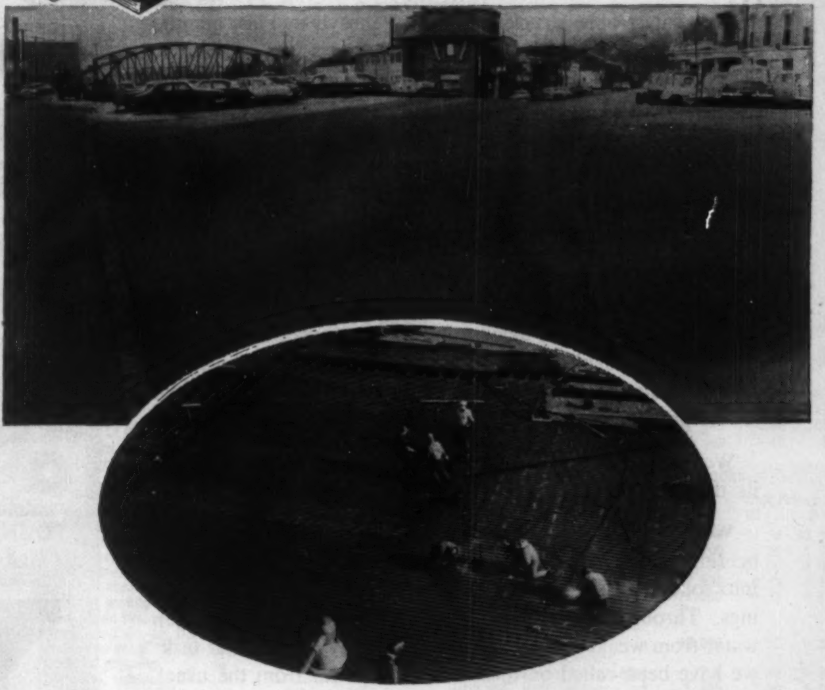
re-floored with
STRUCTURAL-PLATE
USF® Bridge Flooring



For speed . . . for economy . . . the engineers selected USF Structural-Plate Bridge Flooring to restore the worn plank and block floor of the world's widest bridge at Lockport, N. Y. Actually a 400 ft. wide cover over the New York State Barge Canal, this 'bridge' posed a problem both from traffic rerouting and limited funds.

The solution was found in USF Structural-Plate Bridge Flooring which was rapidly welded in place and paved with asphaltic concrete. Material and labor were held to a minimum, and the least possible traffic delay was experienced.

Wherever worn plank floors are demanding constant repairs, replace them quickly and economically with USF Structural-Plate Bridge Flooring. Write for complete descriptive bulletin.

UNITED STEEL USF FABRICATORS, Inc.
WOOSTER OHIO

Steel Doors and Frames • Prefabricated Steel Buildings
• Steel Bridge Flooring • Highway Guard Rail
• Corrugated Metal Drainage Products

Here is how MANU-MINE is helping rebuild Flood Damaged Areas in Delaware and Lehigh Valleys

When catastrophe struck in Eastern Pennsylvania last month, a fully integrated staff of over 200 engineers and experts at MANU-MINE Research & Development Company rolled up their sleeves and went to work.

We were called in by private industry, utilities and municipalities to repair and rebuild. Property damage in some areas was almost unbelievable, without counting interruption in business and loss of income for workers.

In the many rebuilding tasks we have undertaken, our objectives are twofold. 1. Completion of each must be rapid and permanent; secure against future recurrence. 2. Each job must have available the full resources of our organization to assure maximum future safety, stability and strength — at the lowest possible cost.

We at MANU-MINE know water. We know how to measure its destructiveness.

We build and repair reservoirs, employing entirely new engineering techniques. We change sub-surface water bearing sand into solid rock for stronger, permanent foundations and footings. Through sound geological engineering skills we keep water from weakening superhighways. Many of the other tasks we have been called on to accomplish are far from the usual.

The wealth of knowledge and experience we have gained in some of man's most difficult conquests of nature are yours to employ to repair the destruction that exists today or to build for greater progress tomorrow.

To give you a better understanding of MANU-MINE'S *varied services, we have prepared several interesting brochures. Copies are available upon request.*

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The fastest, strongest and most versatile industrial and commercial buildings.

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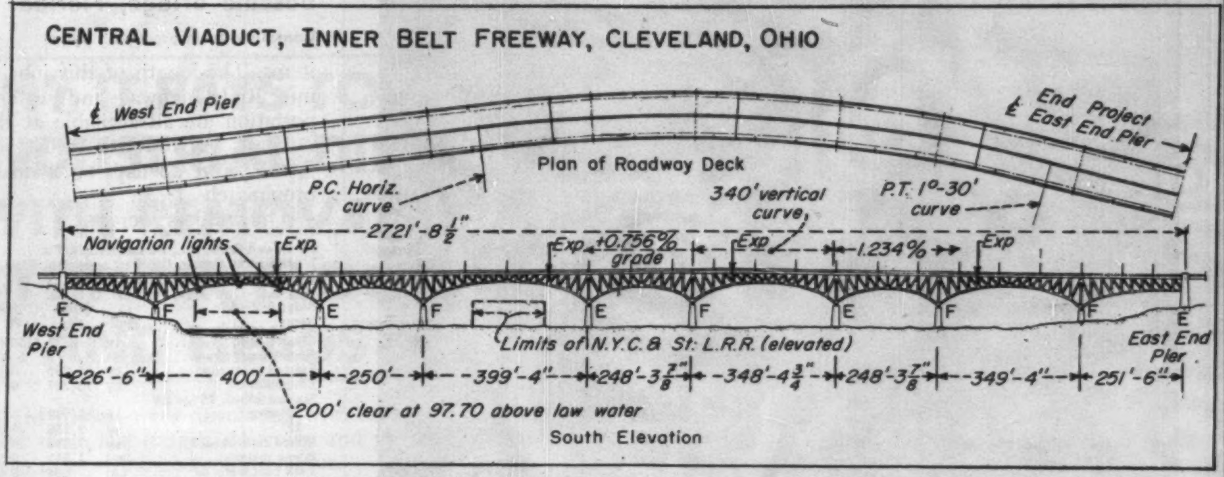


Central Viaduct, Largest Structure on Cleveland Inner Belt Freeway

Crossing four railroads, the Cuyahoga River and various Cleveland streets the Central Viaduct will link the freeway system with downtown Cleveland. Ohio Department of Highways, S. O. Linzell, director, awarded this $8.1 million contract to John F. Beasley Construction Co., Chicago, the low of four bidders.

Work includes two lines of deck cantilever trusses with curved bottom chords, spaced 90'-4" c to c. Transverse floor beam trusses at 25' support continuous steel stringers and a reinforced concrete deck. Nine spans total just under 2722 ft and the deck carries two roadways of 52 ft, a median of 4 ft and 3-ft sidewalks. It must be completed by November 30, 1957.

A curved, ascending alignment complicated the steelwork. This includes two tangents meeting in a 1°30' horizontal curve for about 1,400 ft of the middle portion of the bridge. The profile includes an ascending grade, a short vertical curve nearly centered on the PI of the horizontal curve, and a descending grade.

The substructure, let under an earlier contract, is under construction. It consists of individual hollow concrete piers supported on cast-in-place concrete piles.

All materials are furnished by the contractor. Class C concrete requires 6.5 sacks of cement per cu yd.

The contractor must carry up to $300,000 in public liability insurance and up to $600,000 in property damage insurance including coverage for damage to railroad property.

Minimum wage rates to be paid include: for air compressor operators on steel erection $3.40, crane operators $3.40, carpenters $3.325, structural painters $3.20, intermediate skills $2.575-3.125, unskilled workers $1.90 per hour.

Bidders include:

1C	John F. Beasley Constr Co., Chicago, Ill.	$8,132,000
2	American Bridge Div., U. S. Steel Corp., Cincinnati, Ohio	8,168,683
4	Mount Vernon Bridge Co., Mt. Vernon, Ohio	8,483,831
EE	Ohio Department of Highways	7,781,630

Bids: 7-12-55 Items	Unit	Quantity	Unit Prices 1C	 2
Concrete Cl C	cy	7,280	$65.00	$83 00
Steel, reinf.	lb	2,324,480	0.11	0.15
struct, carbon	lb	15,000,000	0.261	0.256
struct, manganese	lb	9,660,000	0.27	0.266
Fld painting, struct steel & drain sys	lb	25,733,000	0.0065	0.007
Cop water stops, incl 1" hot poured jt sealer	lf	2,592	4.00	3 15
Rubber expan jt filler 1" prefm gray	sf	73	4.00	4.05
Handrail, aluminum	lf	5,404	14.00	17.00
Walkway grating	sf	8,225	3.50	3.65
Rdwy lightg sys, prt A	ls	lump	25,000	66,150
Rdwy lightg sys, prt B	ls	lump	15,000	24 690
Navigation lights	ls	lump	2,000	8,200
Electrical grounds	ls	lump	2,000	5,400
Cop tubes, subdrain wearg surf crse	ea	738	6.00	7.65
Rdwy drainage sys	lb	1,073,000	0.43	0.325
Premium on industrial ins	ls	lump	60,000	12,000
Maintng traf, incl lights, sgns, barricades & watchmen, 24-hr serv	ls	lump	27,713	25,000

Substructure

1C	Horvitz Co., Cleveland	$1,466,198
2	National Engring & Contr Co. Cleveland	1,545,331
9	L. B. Strandberg & Son Co., Inc, Chicago	2,210,132
EE	State of Ohio, Department of Highways	2,156,200

Bids: 10-14-54 Items	Unit	Quantity	Unit Prices 1C	 2
Cofferdams, cribs, sheetg	ea	20	$2,800	$5,000
Excav, unclas	cy	17,227	2.70	3.20
Conc, Cl E, footings	cy	6,098	26.30	21.00
above footgs.	cy	5,171	35.00	38.00
Steel, reinf	lb	1,393,558	0.11	0.105
struct	lb	29,148	0.40	0.36
WI ladder rungs	lb	7,021	0.45	0.50
Fld paint, struct stl, 2 cts	ls	job	300.00	1,100
Xpan jt matl, ½" spng rub	sf	716	2.00	1.50
Pile test load, first	ls	job	900.00	1,750
subsequent	ea	5	800.00	1,200
Piles, steel bearing	lf	4,680	5.50	5.30
RC cip 14"	lf	113,045	4.35	4.65
Remov exist struct, No. 1	ls	job	65,000	45,000
2	ls	job	40,000	34,300
3	ls	job	1,000	10,000
4	ls	job	1,000	8,250
conc pedestals	ls	job	5,000	1,400
Electrical grounds	ls	job	1,100	460
WIP incl specls, 8"	lf	1,036	17.00	20.00
Pipe for storm sewers, 8"	lf	6	5.00	2.50
12"	lf	1,333	4.40	5.50
under pave, 12"	lf	251	7.20	15.00
15"	lf	335	5.00	6.22
ESRC culv, 15"	lf	288	11.20	13.00
under pave, 18"	lf	80	10.00	7.00
21"	lf	142	7.50	8.50
24"	lf	932	9.00	10.00
ESRC culv, 24"	lf	290	11.00	14.00
under pave, 24"	lf	116	18.00	21.00
pav bit ctd CMP, 24"	lf	60	8.50	11.00
pav bit ctd CMP, 27"	lf	80	10.40	14.00
ESRC culv, 36"	lf	30	20.00	28.00
Pipe specials, 12", 35° wye	ea	1	20.00	18.00
8" to 12" increaser	ea	16	20.00	15.00
8" to 15" increaser	ea	2	27.00	21.00
Manholes, std No. 1	ea	16	320	340
Ater manhol A	ls	job	2,100	4,100
B	ls	job	1,200	2,700
C	ls	job	125	380
D	ls	job	820	1,400
F	ls	job	1,400	2,700
Outlet structure A	ls	job	240	570
B	ls	job	240	570
C	ls	job	200	630
Remove manhole E	ls	job	40	30

Support for Erie Railroad Tracks

Items	Unit	Quantity	Unit Prices 1C	 2
Excav, roadway	cy	5,940	$1.50	$2.20
Borrow	cy	3,000	0.50	2.00
Conc, Cl E, anchor caps	cy	73	57.00	65.00
Steel, reinf in anchor caps	lb	7,900	0.13	0.18
Steel sheet piling*	lb	877,000	0.13	0.12
Steel anchor rods, trnbkls, pipe slvs & fastn, dockwalls†	lb	43,000	0.26	0.32
Fenders for dockwalls, creos timbr, inc hdware	Mbf	2.4	325.00	700.00
Crib wall, temp. timber	sf	1,965	4.00	5.50
Maint & safegrd traffic, incl lights, signs, watchman	ls	job	1,000	5,000
Premium on industl insurance	ls	job	7,000	7,120

* incl reinf plate, steel H anchor piles & steel wales, and timber connection angles, for dockwall

† incl necessary excav, sheeting and bracing

	1C	2
Total for bridge substructure	$1,308,770	$1,378,489
Total for support for Erie tracks	149,428	156,723
Maint traffic and insurance	8,000	12,120

Bascule Bridge at Ft. Lauderdale, Florida

Contract for the 235 ft bridge with a single-leaf, electrically operated bascule span at Fort Lauderdale, Fla. went to Powell Bros., Inc., of Ft. Lauderdale at $505,638, the low of two bids. Work is for the State Road Department under the direction of H. E. Lewis, state highway engineer.

The bascule span piers are founded on concrete piling. I-beam approach spans are on concrete bents. Incidental bridge and approach work in this contract include maintenance of traffic, constructing and removing a detour, embankment, road base and surface course and incidental roadway

Continued on following page

(*Advertisement*)

THE IMMENSITY of the Los Angeles County Sewer system project is accentuated by comparison of workmen with 144 inch diameter concrete pipe.

Vibration Important Feature in Production of 144 Inch Concrete Pipe

- **Los Angeles installation**—The expansion of facilities of the County Sanitation Districts of Los Angeles necessitated installation of 7800 feet of 12 foot diameter reinforced concrete pipe. The pipe is 12 feet in length with tongue and groove joints and with a shell thickness of 12 inches. The pipe sections weigh about 39 tons per length.

- **Manufactured at plant**—Reinforcing consisted of a double cage, one of which was elliptical in shape. Cages were manufactured at the plant site and the circumferential reinforcement welded to the longitudinal bars. The cages were dropped over the inner form and held in place by appropriate spars. The outer form was then placed, and the job was poured in the usual manner.

CONTROLLED HIGH SPEED external vibration with Viber Model PX vibrator produces smoother finished surface inside and out. High strengths obtained in this pipe would have been impossible without vibration.

- **Tests made**—United Concrete Pipe Corporation used three Model PX Vibrators on steel forms specially constructed to eliminate leakage of grout or water. Tests made of concrete in these pipes show high strengths, as much as 7000 pounds per square inch not being uncommon.

- **An interesting manual**—on "How to Apply, Operate and Maintain EXTERNAL VIBRATORS in the MANUFACTURE of CONCRETE PIPE" can be obtained by writing Viber Company, Burbank, California.

- **For further information**—on Viber's complete line of internal and external vibrators, contact your authorized distributor, or Viber Company, Dept. 76, 726 South Flower Street, Burbank, California.

VIBER CO

CONCRETE VIBRATORS SINCE 1931

Bascule Bridge, Florida

Continued from preceding page

items. The length of this job is 0.288 mi. Rail, highway and water transportation are all available at the site.

Class A concrete must develop 5,000 psi at 28 days on a mix of approximately 1:2:4.

The bidders were:

1C Powell Bros., Inc., Ft. Lauderdale, Fla.	$505,638
2 Industrial Constr. Co., Ft. Lauderdale, Fla.	535,903
EE State Road Department of Florida	500,000

Bids: 6-23-55 Items	Unit	Quantity	Unit Price 1C	2
Clear & grub	acre	5.22	$150.00	$200.00
Remov exist struct	ls	1	5,000	8,500
Subsoil excavation	cy	35,695	0.40	0.31
Embankment	cy	73,527	0.60	0.81
Stablzd rdbed, 75 lbs BV				
6" deep	sy	2,792	0.20	0.18
12"	sy	9,156	0.30	0.28
Miami rock base, 8"	sy	7,556	0.98	0.98
Prime material	gal	1,511	0.20	0.22
Tack coat material	gal	604	0.20	0.20
Bit surf trtmt, type 1-A				
semisol asph	sy	7,556	0.25	0.21
cutback asph	sy	7,556	No Bid	No Bid
emulsified asph	sy	7,556	No Bid	No Bid
Asph cement plant mix	gal	7,334	0.13	0.14
Asph conc surf crse, type II, vari thickness	t	416	6.50	7.15
Cmt conc pave, reinf 9"	sy	239	10.00	10.00
Treat struct timb, 12-lb.	Mbm	11.7	400.00	400.00
Conc, Cl A, appr spans	cy	404.6	50.00	65.00
bascule pier	cy	842	45.00	40.00
counterweight	cy	192	45.00	41.00
endwalls	cy	5.06	85.00	100.00
Concrete, seal	cy	349	45.00	65.00
Concrete, handrail	lf	356	9.00	12.50
Steel reinf	lb	155,960	0.11	0.11
Steel structl,				
bascule leaf, 234,000 lb	ls	1	65,000	68,550
approach spans	lb	196,830	0.14	0.16
Machinery & castings	ls	1	35,000	41,600
Conc pipe culv, 15" storm sewer	lf	236	5.00	3.00
Bit ctd MP culv, 15" storm sewer	lf	103	5.00	3.00
Treated timber piling	lf	4,690	2.75	2.90
Precast conc piling, 18" sq	lf	6,200	8.00	7.80
Unloaded test piling, 18" sq	lf	180	25.00	25.00
Test load	ea	1	500.00	750.00
Inlets	ea	8	325.00	300.00
Conc curb & gutter	lf	80	2.00	3.30
Conc sidewlk, 4"	sy	36	4.00	4.00
ROW mrkrs, instl only	ea	4	5.00	2.00
Metal guardrail	lf	1,550	3.00	2.90
Grassing & mulching	sy	17,600	0.10	0.045
Mulch material	ton	11	60.00	50.00
Steel rdwy floor, 5"	sf	2,674	5.00	5.30
3" armored	sf	777	4.00	4.60
Steel sidewalk floor	sf	480	4.00	4.20
Control house	ls	1	6,000	5,000
Electrical equipment	ls	1	34,000	28,000
Shear connectors	lb	4,278	0.50	0.50
Spec conc gutter	lf	2,358	2.25	1.95
Conc traf separator type I	lf	1,249	4.00	3.87
Construction of detour	ls	1	30,000	29,000
Maintenance of detour	mo	12	200.00	175.00
Replac fender piles, detour bridge	ea	15	25.00	50.00
Fender timbers, detour bridge	Mbm	2	300.00	150.00
Remov detour	ls	1	3,500	4,500

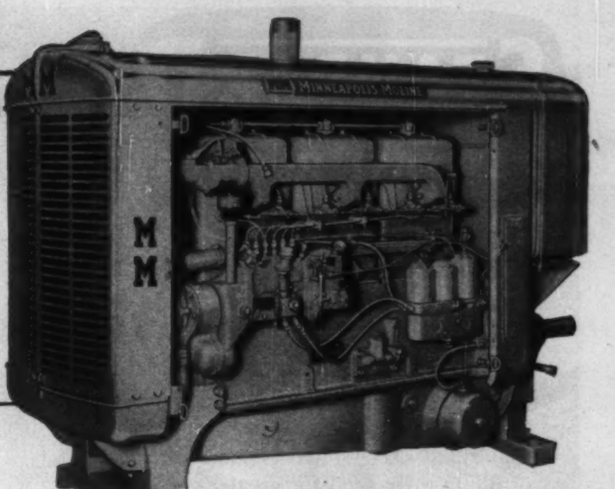
Time allowed: 300 working days. Liquidated damages, engineering expense for extra time for completing job

Highways

Primary Road System for Air Force Academy, Colo.

Clearing, grading and draining 9.3 mi of two- and four-lane roads for the primary road system of the Air Force Academy site 12 miles north of Colorado Springs, Colo. will cost $461,707. This contract with Nowers Construction Co. is with the Air Force Academy Construction Agency, Colorado Springs, Major T. E. Correll, contracting officer and assistant chief of staff, installations. Skidmore, Owings &

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

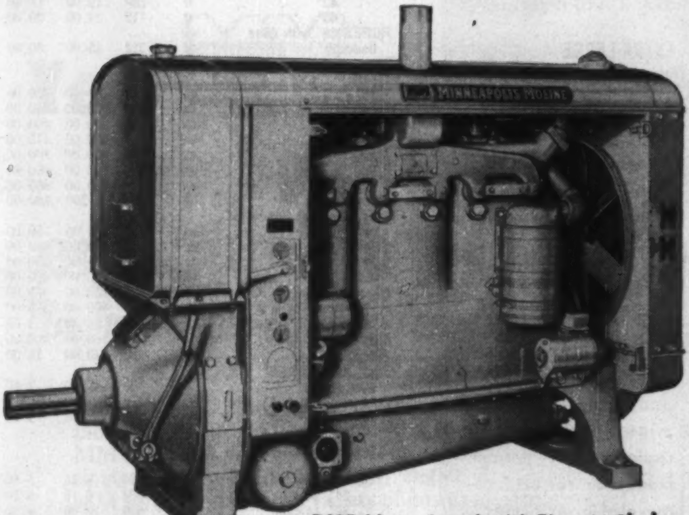


New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

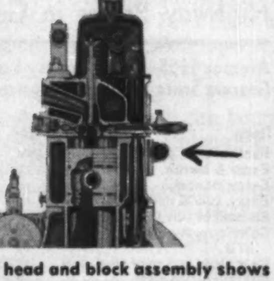
To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.

YOU GET THESE ADDED ADVANTAGES . . .

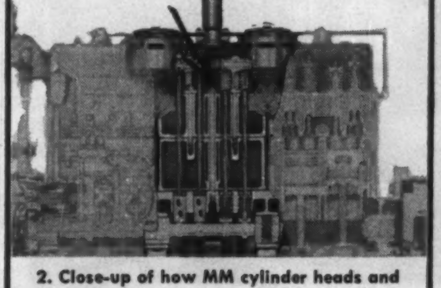


D605-6A equipped with Thermo-Clad base pan.

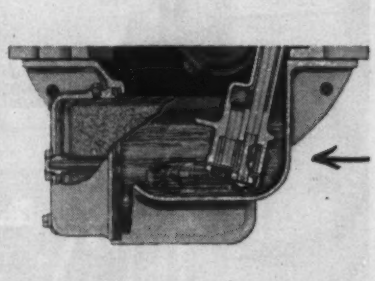
1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.



3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Thermo-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

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MM
MINNEAPOLIS-MOLINE
MODERN MACHINERY
DIVISION

MINNEAPOLIS-MOLINE

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ASPHALT PLANTS

MAKE ASPHALT FASTER—BETTER—CHEAPER, Because...

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Paving the Nation

Contractors throughout the nation recognize that STANDARD Asphalt Plants do the best job of filling their need for greater capacity, and faster production with practically no maintenance. Join the parade of profit and quality-conscious paving contractors...buy STANDARD ...the asphalt plant that does MORE for you and your customers.

no bottlenecks

Every unit of a STANDARD Asphalt Plant is engineered to speed the flow of materials, cut man hours per batch and to increase capacity.

EXTRA-LARGE DRYER CAPACITY

Size-for-size, STANDARD dryers out-perform all others in capacity and efficiency. Internal design permits more aggregate to be exposed *longer* to *more* heated air.

OVERSIZED ELEVATORS

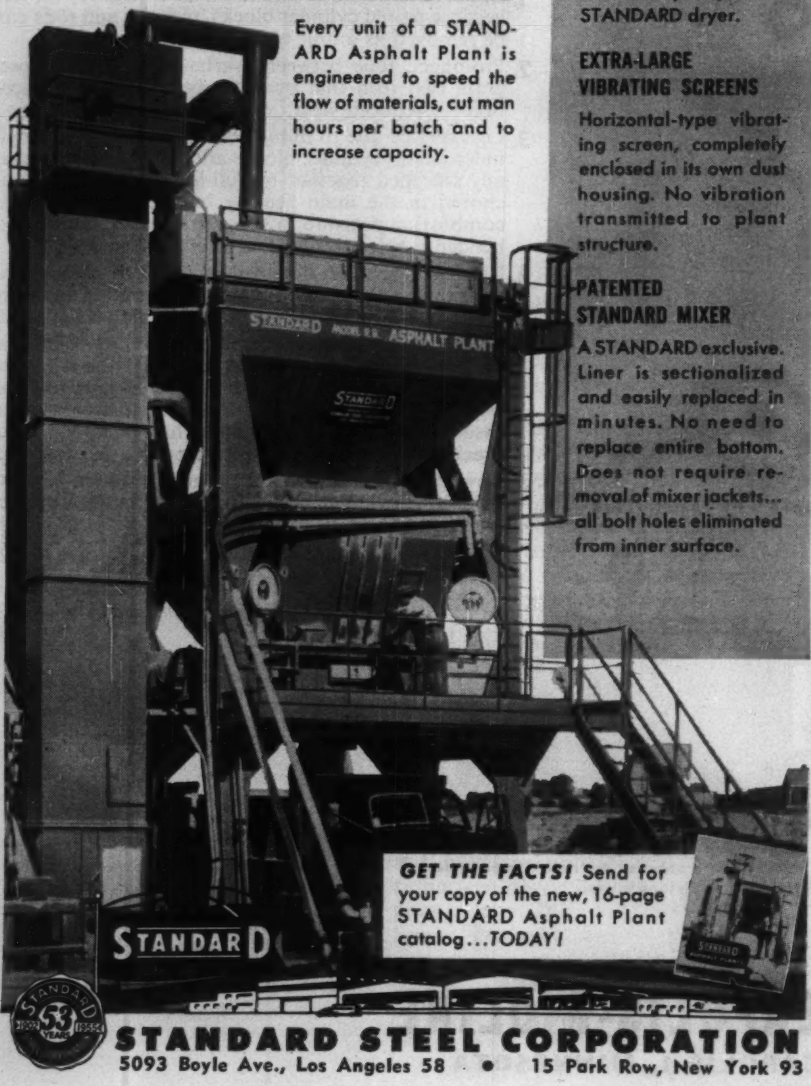
Elevators are of the vertical type with an extra-wide margin of capacity. Designed to handle the greater production capacity of the STANDARD dryer.

EXTRA-LARGE VIBRATING SCREENS

Horizontal-type vibrating screen, completely enclosed in its own dust housing. No vibration transmitted to plant structure.

PATENTED STANDARD MIXER

A STANDARD exclusive. Liner is sectionalized and easily replaced in minutes. No need to replace entire bottom. Does not require removal of mixer jackets... all bolt holes eliminated from inner surface.


STANDARD MODEL R.R. ASPHALT PLANT
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STANDARD STEEL CORPORATION
5093 Boyle Ave., Los Angeles 58 • 15 Park Row, New York 93

Merrill, Chicago, are architects and engineers.

Both rail and highway transport are available to the site.

All materials are furnished by the contractor. Concrete must test at 3,000 psi at 28 days.

Minimum wages range from $1.75 for common labor through $1.90 for semi skilled to $2.50 and over for skilled trades.

Eight bidders include:

1B	Nowers Construction Co., Pueblo, Colo	$463,318
1AC		461,707
2B	R. B. Potashnick, Cape Girardeau, Mo	475,885
2A		470,716
8A	L. J. Hessel, Greeley, Colo	796,006
8B		808,546

• B base bid • A CMP alternate • C contract

Bids: 6-1-55 Items	Unit	Quantity	Unit Prices 1C	2
Clear, grub entire wk area	ls	job	$35,000	$20,000
Excavation	cy	537,000	0.48	0.45
Spot subgrade reinforcement	cy	300	3.00	5.00
Sub-base, 6" select matl	cy	29,000	1.55	3.00
Reinf conc structures				
Box culvert a	ea	1	10,700	14,000
Box culvert b	ea	1	8,500	20,000
Box culvert c	ea	1	6,500	8,000
Box culvert d	ea	1	4,000	6,000
Reinforced concrete pipe				
RCPSS 18"	lf	164	5.00	6.25
24"	lf	384	7.00	7.50
30"	lf	600	9.50	9.00
36"	lf	634	14.00	13.00
42"	lf	384	19.00	17.00
48"	lf	112	24.00	20.00
RCPES 66" with conc bedding	lf	312	45.00	60.00
Stnd headwall, single, conc				
18"	ea	3	200.00	200.00
24"	ea	5	300.00	350.00
30"	ea	10	400.00	400.00
36"	ea	7	500.00	475.00
42"	ea	6	600.00	700.00
48"	ea	4	700.00	900.00
66"	ea	4	950.00	800.00
triple, conc 36"	ea	2	1,200	900.00
Stnd intercept headwalls				
conc 18"	ea	1	300.00	150.00
24"	ea	5	400.00	160.00
36"	ea	3	600.00	250.00
42"	ea	2	700.00	300.00
Median inlet, type A	ea	3	600.00	375.00
type B	ea	7	800.00	375.00
Rock for slope protection	cy	500	25.00	5.00
Sheet & bracing lip	Mfbm	1	500.00	300.00
Riprap	cy	60	40.00	15.00
Pipe sub-drain, 6", perf clay	lf	100	12.00	2.50
Pipe sub-drain, 8", clay sewer	100	100	12.00	2.25

Alternate Drainage Pipe

CMP 18", 14 gage	lf	164	4.25	5.50
24", 14 gage	lf	384	6.10	6.50
30", 14 gage	lf	600	10.00	8.50
36", 14 gage	lf	634	13.00	12.00
42", 12 gage	lf	384	18.00	16.00
48", 12 gage	lf	112	23.00	18.00
66", 10 gage	lf	312	44.00	50.00

Highway Prices in Georgia

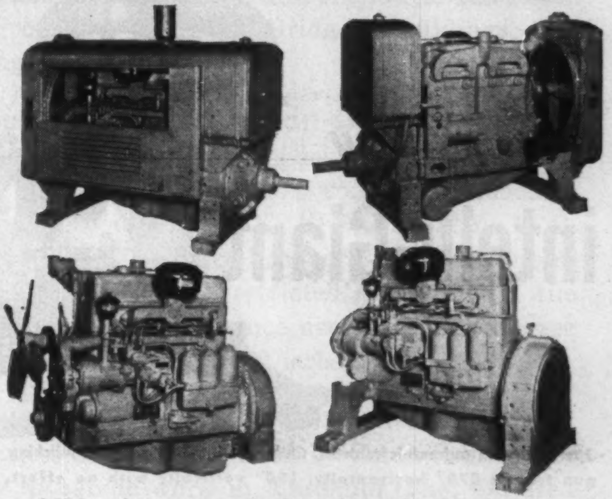
Average 1955 low bid prices of roadway items, Georgia State Highway Department.

Items	Unit	Letting Dates May 6	June 24
Random clear & grub	acre	$70.00	$62.50
Excav & borrow, uncl	cy	0.22	0.22
Excav channel	cy	0.65	0.65
Excav, culv & minor struct	cy	1.25	1.15
Sel matl bf culv foundation	cy	2.85	2.60
Concrete cl A	cy	39.00	38.00
Cl B	cy	42.00	41.00
Conc steps, incl reinf steel, cl B	cy	58.00	58.00
Bar reinforcing steel	lb	0.11	0.11
Pipe SD 15"	lf	2.00	2.00
18"	lf	2.40	2.45
24"	lf	3.60	3.50
30"	lf	4.75	4.75
Pipe CD 15"	lf	2.58	2.70
18"	lf	3.00	3.00
24"	lf	4.35	4.50
30"	lf	5.70	5.75
36"	lf	7.80	7.70
42"	lf	10.00	10.00
48"	lf	11.75	11.75
54"	lf	18.75	18.75
60"	lf	21.00	21.00

Continued on following page

Yes, MM Engines are built and equipped to order

FURNISHED TO YOUR SPECIFICATIONS IN LOTS OF 1 OR 100!



You get power adaption that fits your specifications more readily with Minneapolis-Moline engines. Why MM? Because, as an independent engine builder, no single sales outlet dictates MM engine design—and MM works in such a big variety of power applications.

To meet a wide range of basic requirements MM engines have large displacement for high torque at moderate rpm. Extra high compression and high turbulence combustion combined with high volumetric efficiency provide outstanding performance.

For these reasons MM units are ready to go when equipped with specified operating accessories. You eliminate major auxiliary unit purchases to adapt engine characteristics to meet momentary high load demands. Further long run benefits are low fuel consumption and low maintenance that total up to low cost production.

Every-day experience in supplying a wide range of unit requirements enables MM to maintain customary high quality in single or small lot quantities at reasonable cost.

A high degree of standardization results in high production parts that provide precision fits and permit MM to schedule parts for special units in large quantity, assuring early delivery and customer service.

MM engines are completely engineered and equipped for gasoline, LP gas, natural gas, or distillate fuels. Sizes range from 206 cu. in. portable units to 1600 cu. in. stationary engines and are available for fan to flywheel application or completely enclosed leg mounted installations. MM also builds a line of industrial Diesel power units: Sizes—283-, 425-, 605 cu. in.

Standard equipment includes vacuum crankcase ventilation, thermostat controlled bypass cooling, packaged water pump, built in variable speed governors, enclosed gear driven oil pump, and oversize full-flow oil filters (shunt-type filters are provided exclusive on MM Thermo-Clad units).

Send details on your application for examples of MM built-to-order packages for original or replacement needs. Engineering service available for pumps, hoists, crushers, generators, shovels, ditchers, cranes, compressors, feed mills, saw mills, planing mills and similar installations. When you want dependable performance year after year from your engine, you want an MM Industrial Power Unit.

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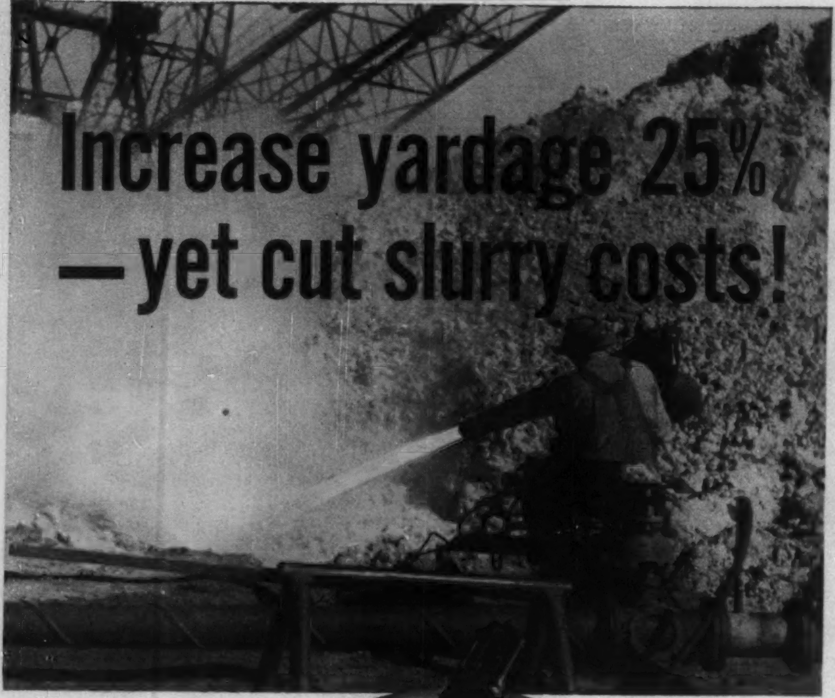
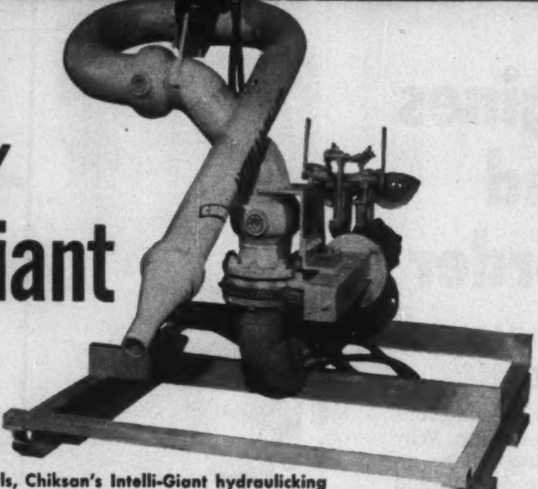


Increase yardage 25% —yet cut slurry costs!



CHIKSAN

intelli-Giant

Operated with automatic controls, Chiksan's Intelli-Giant hydraulicking gun travels 270° horizontally, 120° vertically with no effort.

Operating at 30 to 300 lbs. pressure, the Chiksan Intelli-Giant helps feed solids in direct ratio to the Slurry pump's maximum capacity and efficiency. In Florida's phosphate fields, companies using the Intelli-Giant are increasing yardage moved by some 25%. And when handling 800 to 1000 tons per hour at a ratio of 40% solids, this increase in production amounts to hundreds of dollars daily.

Chiksan's Intelli-Giant slashes your labor costs as well. One operator reports a yearly labor saving of $10,000. Another operator estimates his 3 Chiksan Intelli-Giants will save $22,000 a year in direct labor costs.

Get the facts on the Chiksan Intelli-Giant for your operation.

For detailed information write today to Dept. 239

CHIKSAN intelli-Giant

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Brea, California • Chicago 3, Illinois • Newark 2, New Jersey
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Brea, Calif.; Newark 2, New Jersey, Chiksan of Canada Ltd., Edmonton, Alta.

Highway Prices in Georgia

Continued from preceding page

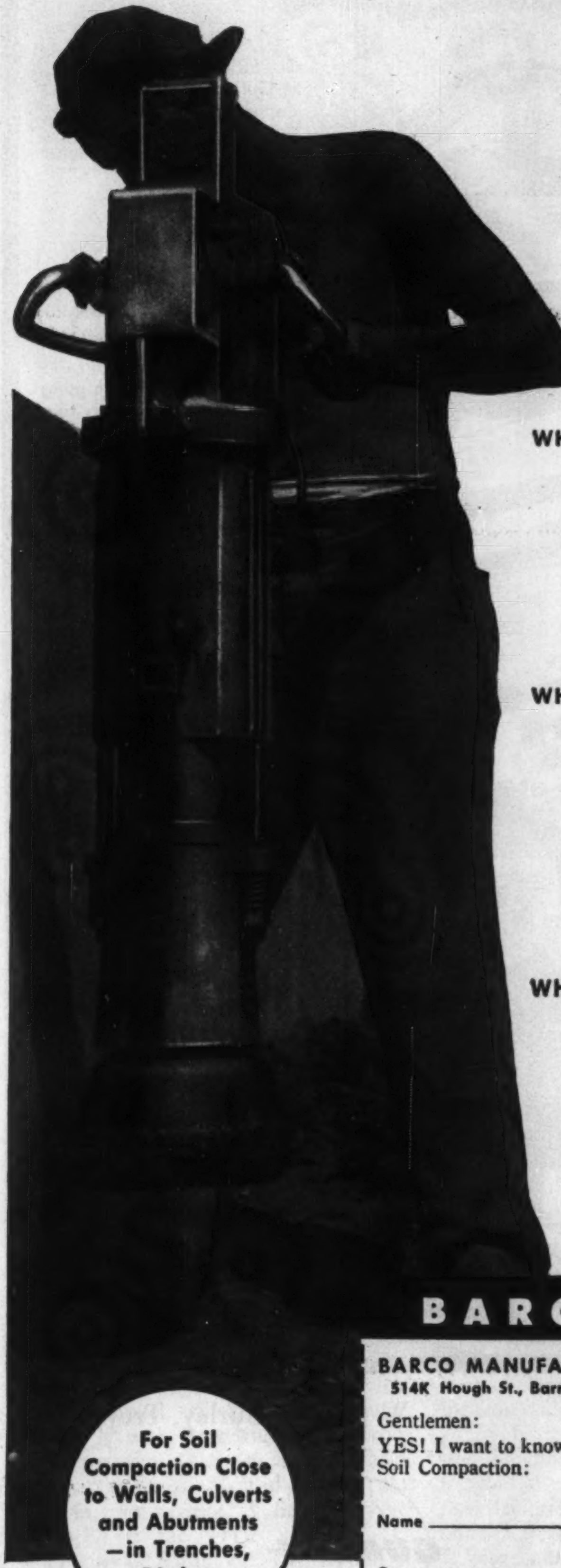
Items	Unit	Letting Dates May 6	Letting Dates June 24
Culvert pipe removed	lf	0.60	0.55
Relaid	lf	0.65	0.65
Plain rip rap	sy	4.95	5.00
Concrete R/W markers	ea	4.65	4.65
Seeding	sy	0.04	0.05
Sprigging	sy	0.03	0.03
Loose sod	sy	0.45	0.50
Block sod	sy	0.70	0.60
Sod ditch checks	sy	0.55	0.55
Fertilizer, first application	ton	50.00	50.00
Second application (nitro. cont)	lb	0.25	0.25
Local matl base or surf	cy	0.43	0.45
Selected material shoulders	cy	0.50	0.50
Subgrade treatment material	cy	0.40	0.40
Overhaul on local material . . ½ mile	yd	0.03	0.03
Cutback asphalt prime	gal	0.15	0.15
Single surf treatment, type 1	sy	0.17	0.17
Liquid seal	sy	0.11	0.11
Concrete sidewalk 4"	sy	2.90	2.75
6"	sy	3.85	3.75
Perforated pipe underdrain 6"	lf	1.30	1.30
Remove cl A concrete	cy	$15.00	$15.00
Cl B concrete	cy	7.50	7.50
Concrete valley gutter, 6"	sy	5.00	5.00
Concrete gutter with RE, 6"x30"	lf	1.75	1.75
Comb conc curb & gutter, 6"x30"	lf	2.00	2.00
Grading per mile	pm	400.00	400.00
Machine grading	pm	425.00	425.00
Preparation of base	pm	450.00	450.00
Reinf conc approach slab	sy	9.70	9.75
Concrete slope drain	lf	3.00	3.00
Slope drain, 8"	lf	2.00	1.90
10"	lf	2.10	2.15
Catch basins, H-4' or less	ea	150.00	150.00
Addl depth catch basins	lf	20.00	15.00
Guard rail incl posts	lf	3.80	3.75
Finishing & dressing	sy	0.02	0.015
Drop inlets, H-4' or less	ea	125.00	125.00
Addl depth drop inlets	lf	22.50	10.00
Asphalt tack coat	gal	0.15	0.15
B-binder, & hot	ton	4.80	4.80
Asphaltic concrete "E"	ton	4.57	4.57
Asphaltic material AC 8	gal	0.11	0.11

Highway Prices, Oregon

1954 average contract unit prices reported by Oregon State Highway Department

Item	Unit	AveragePrice 1954 City Proj	AveragePrice 1954 All Proj
Excavation, structural	cy	$4.05	$2.97
drainage	cy	2.65	2.15
single class	cy	1.12	....
borrow	cy	1.00	....
Short overhaul	stay	0.03	0.007
Blade grader	hr	11.48	10.14
Concrete pipe, sewer 8"	lf	1.18	1.38
10"	lf	2.00	2.00
12"	lf	2.06	2.12
18"	lf	3.16	3.20
24"	lf	5.00	5.00
culvert 12"	lf	2.48	1.92
18"	lf	4.00	3.34
24"	lf	6.00	4.48
Metal pipe, perf. drain 6"	lf	2.00	1.56
Drain pipe, coated 12"	lf	3.00	3.32
Culvert pipe 12"	lf	3.09	3.05
Arch type pipe 43" x 27"	lf	20.00	20.00
Xtra to instl pipe under pave	lf	1.00	1.79
Special backfill in drains	cy	6.00	....
Selec roadbed topping	cy	1.81	1.30*
Material in base, coarse	cy	1.53	0.95
4"-0"	cy	1.50	1.50
3"-0"	cy	2.71	1.93
2½"-0"	cy	2.95	....
¾"-0"	cy	3.57	2.00
Sprinkling	Mgal	3.40	2.03
Asphalt in tack coat, RS-1	t	57.22	45.82
in binder crs RC-3	t	53.86	40.32
MC-2	t	56.59	42.53
Mat in binder course ¾"-0"	cy	4.76	3.00
cushion course ½"-0"	cy	4.80	....
Asphaltic concrete Cl C	t	8.12	6.08
Cl B	t	8.24	5.50
Portland cement conc pave	sy	3.70	3.70
Expansion joints in pavement	lf	0.35	0.35
Contraction joints in pavement	lf	0.18	0.18
Dowel bars, ¾" x 18"	ea	0.70	....
Asph concrete traffic markers	lf	0.97	1.14
Concrete catch basins	ea	72.10	72.10
Curbs	cy	42.46	36.10
Driveways	sy	4.00	3.84
Walks	sy	2.85	3.00
Expansion joints in walks	lf	0.20	0.20
Concrete manholes	ea	262.50	253.71
Adjustment of catch basins	ea	20.00	22.17
manholes	ea	31.39	38.52
Reconstr of catch basins	ea	200.00	200.00
Removal of curbs	lf	0.21	0.23
concrete and masonry	cy	30.00	20.00
pavement	sy	0.65	0.38
pavement and walks	sy	1.43	1.43
walks and driveways	sy	0.35	0.41

* incl haul



WHEN CONSTRUCTION JOBS CALL FOR SOIL COMPACTION

BARCO is the ANSWER!

WHEN YOU'RE FIGURING FOR THE "LOW BID"—No other tool can give you the economy and dependability offered by Barco Rammers on high degree soil compaction for all kinds of projects—Atomic Energy, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Airports, Bridges, Buildings, and Housing Developments!

WHEN YOU HAVE TO MEET TOUGH SPECIFICATIONS—In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—EASILY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially useful for compacting fill in restricted areas. ONLY the Barco Rammer can produce specified high degree compaction on lifts up to 20 inches.

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For Soil Compaction Close to Walls, Culverts and Abutments —in Trenches, Ditches

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YES! I want to know about Barco Rammers for Soil Compaction:

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☐ Please send me the name and address of your nearest dealer.

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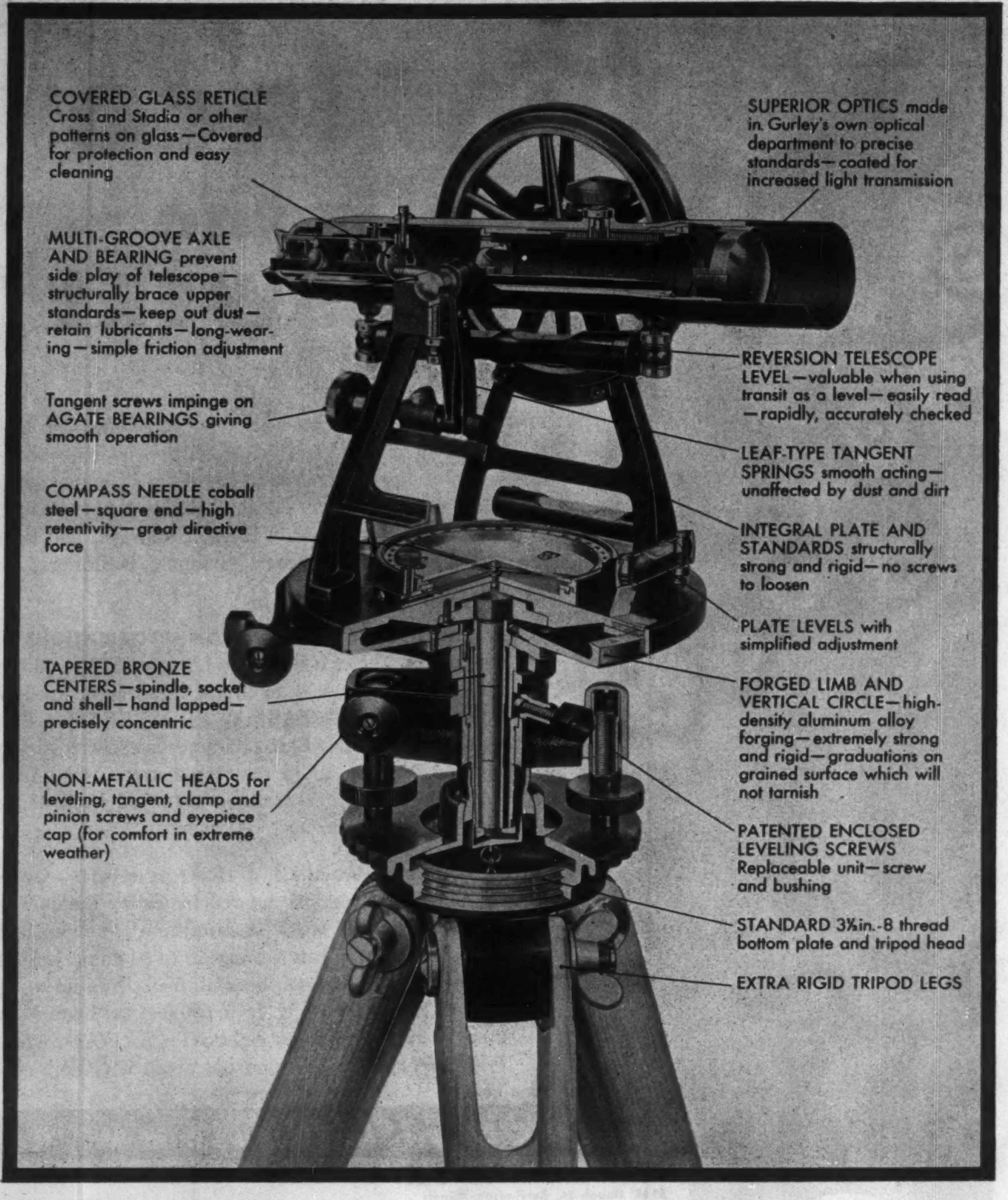
☐ Please send General Catalog No. 621.

☐ Please send free bulletin on "SOIL COMPACTION COST DATA."



COVERED GLASS RETICLE Cross and Stadia or other patterns on glass—Covered for protection and easy cleaning

MULTI-GROOVE AXLE AND BEARING prevent side play of telescope—structurally brace upper standards—keep out dust—retain lubricants—long-wearing—simple friction adjustment

Tangent screws impinge on **AGATE BEARINGS** giving smooth operation

COMPASS NEEDLE cobalt steel—square end—high retentivity—great directive force

TAPERED BRONZE CENTERS—spindle, socket and shell—hand lapped—precisely concentric

NON-METALLIC HEADS for leveling, tangent, clamp and pinion screws and eyepiece cap (for comfort in extreme weather)

SUPERIOR OPTICS made in Gurley's own optical department to precise standards—coated for increased light transmission

REVERSION TELESCOPE LEVEL—valuable when using transit as a level—easily read—rapidly, accurately checked

LEAF-TYPE TANGENT SPRINGS smooth acting—unaffected by dust and dirt

INTEGRAL PLATE AND STANDARDS structurally strong and rigid—no screws to loosen

PLATE LEVELS with simplified adjustment

FORGED LIMB AND VERTICAL CIRCLE—high-density aluminum alloy forging—extremely strong and rigid—graduations on grained surface which will not tarnish

PATENTED ENCLOSED LEVELING SCREWS Replaceable unit—screw and bushing

STANDARD 3½in.-8 thread bottom plate and tripod head

EXTRA RIGID TRIPOD LEGS

The Gurley Precise Transit

W. & L. E. Gurley, Troy, N. Y.

GURLEY

Highway Bid Price Trends in New York

Selected unit prices for 1948-54 showing weighted averages of contract prices, Department of Public Works, Division of Construction, State of New York.

Items	Unit	1948	1949	1950	1951	1952	1953	1954
Applying water	Mgal	$2.61	$2.16	$1.77	$1.71	$1.73	$2.04	$2.16
Excavation uncl	cy	0.68	0.65	0.72	0.63	0.89	.....	.....
with moisture control	cy	0.52	0.61	0.49	0.57	0.55	0.88	0.70
trench, culv & bridge	cy	2.35	3.40	2.22	2.35	2.79	4.01	4.49
Overhaul	sy	0.006	0.004	0.006	0.006	0.0038	0.0021	0.0057
Trimming road section	lfrd	0.32	0.37	0.37	0.29	0.41a	0.47a	0.51
Preparing fine grade	sy	0.18	0.21	0.20	0.20	0.26	0.31	0.27
Sewer pipe vit 4"	lf	0.65	0.61	0.94	0.98	1.19	1.50	1.53
6"	lf	1.63	1.32	1.51	1.64	1.66	2.00	1.40
8"	lf	1.69	1.77	1.70	2.45	1.87	2.50	1.39
10"	f	2.46	1.93	2.91	3.46	.....	3.06	3.00
12"	lf	3.28	2.53	2.91	3.45	5.25	3.26	2.37
15"	lf	4.00	3.36	3.91	4.47	5.00	5.06	3.72
18"	lf	4.89	5.26	5.04	5.55	7.00	.....	7.00
24"	lf	6.15	7.54	7.89	9.47	13.00	15.00	7.00
Underdrain VCP 4"	lf	0.78	1.01	0.85	1.25	0.77	0.98	0.99
6"	lf	1.17	1.18	1.06	1.41	1.06	1.22	0.95
C or V opt 4"	lf	0.89	1.14	0.73	1.07	1.14	0.88	1.01
6"	lf	1.15	1.31	1.33	1.23	1.01	1.28	1.03
Cor met pipe heavy 12"	lf	3.88	4.14	3.41	3.56	4.13	4.74	4.14
15"	lf	5.13	4.56	3.73	3.96	5.00	5.95	5.26
18"	lf	6.31	5.30	4.66	5.31	4.98	6.69	5.89
24"	lf	8.31	7.68	7.75	8.63	8.33	10.04	8.20
30"	lf	10.36	9.69	10.70	10.00	12.74	16.16	12.88
36"	lf	12.61	11.55	13.50	15.00	15.95	17.84	15.00
42"	lf	14.73	13.00	16.50	25.00	17.00	20.00	19.61
Cast iron pipe 6"	lf	6.80	4.55	4.23	5.09	4.03	4.77	4.94
8"	lf	4.67	4.95	5.06	6.89	5.55	5.78	5.40
10"	lf	7.01	5.75	6.81	.....	6.19	7.00	8.32
12"	lf	8.33	7.01	7.29	9.81	7.59	8.19	7.21
16"	lf	12.11	8.48	6.48	12.45	.....	8.95	9.69
18"	lf	8.89	11.78	10.08	12.79	15.72	10.03	13.48
20"	lf	12.93	16.11	11.67	11.02	18.11	11.42	13.86
24"	lf	15.11	16.09	11.85	22.64	28.31	22.30	14.82
36"	lf	16.00	26.00	24.84	28.00	.....	41.85	.....
Reinf conc culv pipe 12"	lf	2.93	3.43	3.40	3.78	4.00	4.14	4.20
15"	lf	3.91	3.99	3.32	4.54	4.30	4.42	5.28
18"	lf	5.75	5.31	4.87	5.44	5.77	6.18	5.86
21"	lf	5.44	6.70	5.90	6.35	7.87	7.60	8.21
24"	lf	7.92	7.57	6.80	7.90	8.16	8.84	8.49
30"	lf	11.12	10.56	9.48	11.42	12.27	12.32	12.08
36"	lf	15.23	13.09	11.96	13.53	14.37	14.81	14.68
42"	lf	16.91	18.76	14.62	16.60	18.41	18.93	18.22
48"	lf	18.04	20.04	18.90	19.74	22.48	23.37	23.96
54"	lf	27.68	29.09	19.02	24.44	26.21	27.89	26.74
60"	lf	25.74	30.11	25.00	30.65	30.27	32.43	31.94
72"	lf	40.00	44.65	40.00	41.28	42.45	48.27	41.55
Reinf conc sewer pipe 12"	lf	2.58	2.79	2.97	3.87	4.16	3.76	3.64
15"	lf	3.53	5.72	3.68	4.75	4.90	4.70	4.91
18"	lf	4.02	4.55	4.28	5.44	5.83	5.96	5.25
21"	lf	5.24	4.50	5.20	9.15	6.63	.....	.....
24"	lf	6.14	6.60	5.84	8.33	7.85	7 83	7.35
30"	lf	9.86	9.36	7.41	10.00	.....	11.63	10.26
36"	lf	9.04	11.92	10.80	11.25	14.30	13.29	13.54
Portland cement:								
Type 2	bbl	3.64	3.76	3.58	3.90	4.20	4.34	4.34
Type 2A	bbl	3.32	3.45	3.58	4.06	4.09	4.39	4.43
Type 3	bbl	4.99	4.44	4.33	5.00	5.00	4.68	4.49
Type 6, 6A	bbl	8.53	8.49	5 43	10.00	9.99	9.53	11.04
Type N	bbl	4.05	4.21	3.89	4.26	4.40	4.37	4.90
Conc for struct cl 1A	cy	39.85	41.73	39.32	46.26	52.87	57.92	49.06
for railings	cy	108.47	133.31	88.67	94.53	125.64	137.91	135.77
Cl 1	cy	35.58	36.93	33.48	38.00	45.47	46.18	46.23
Cl 2	cy	36.40	27.02	27.68	43.05	43.65	46.17	34.18
Cl 3	cy	34.72	24.10	26.84	35.48	27.91	30.87	31.63
Masonry, stone	cy	130.14	145.38	133.89	139.05	140.44	153.90	160.66
Rub stone, ld with mortr.	cy	42.17	50.09	46.03	48.31	48.09	59.36	65.60
laid dry	cy	18.51	55.93f	22.05	30.61	41.72	50.97	35.96
Metl reinf, conc pave	sy, p	0.56	0.57	0.52	0.66	0.66	0.76	0.86
Steel fab reinf, 6x6—#6ga.	sy	0.51	0.55	0.54	0.67	0.69	0.74	0.71
Bar reinf, conc pave	lb	0.11	0.12	0.11	0.141	0.152	0.141	0.162
Opt. trans jt supports	lfjt	0.90	0.93	0.92	1.12b	2.41	1.69c	1.79
Longit j t supports, opt	ea	0.20d	0.29d	.....	0.83	0.80	0.80	0.82
Bar reinf for structures	lb	0.118	0.126	0.114	0.133	0.133	0.139	0.139
Spiral bar reinf	lb	0.58	0.87	0.80	1.09	0.91	0.82	0.71
Structural steel	lb	0.151	0.143	0.16	0.174	0.18	0.187	0.172
Misc metals	lb	0.21	0.24	0.20	0.221	0.27	0.270	0.27
Pile shoes, f&p	ea	8.36	8.23	8.61	6.67	8.22	15.00	.....
Opt. guide railing	lf	1.98	2.15	1.99	2.28	2.48	2.82	2.98
Opt. guide posts	ea	7.46	8.20	8.23	8.23	8.78	9.03	9.15
Found crse ROB gravel	cy	1.60	1.64	1.33	1.33	1.69	1.87	2.44
screened gravel	cy	4.00	5.14	6.50	.....	.....	.....	.....
broken stone	cy	4.17	5.67	5.25	4.10	7.26	7.00	6.50
ROB grav slag or ROC stone Opt	cy	5.00	3.63	2.32	3.80	6.50	.....	3.61
Bott. crse broken stone	cy	7.25	6.07	6.40	7.22	7.27	7.12	6.77
bit mac pen meth asph.	cy	7.30	6.72	6.41	8.07	8.41	8.10	8.08
Conc foundn for pave	cy	9.73	10.25	8.64	10.97	10.00	11.23	12.46
Cement concrete pavement	cy	10.17	10.96	9.35	10.64	10.96	12.32	12.63
with carbon black	cy	11.63	12.63	10.34e	12.92	12.32	12.92	14.76
Cement concrete pavement	cy	14.44	14.10	13.73	12.95	12.94	16.70	17.10
with carbon black	cy	15.08	15.40	10.00	14.11	13.25	15.00	16.82
two-course	cy	10.85	12.89	9.79	10.78	13.00	11.00	11.72
Asphalt concrete Type 2A.	t	11.17	9.24	9.88	10.50	10.92	11.15	11.52
Opt.	t	8.87	9.56	10.00	.....	10.04	10.82	10.06
Top crse gr grav bit double surf treat	cy	2.03	3.18	2.36	3.28	3.63	5.45	5.26
Bit mac type 1 pen method hot asph	cy	8.00	7.56	7.94	8.38	8.20	9.74	8.04
Bit mat dampproofing	gal	1.08	1.17	1.00	1.23	1.13	1.24	1.00
Membrane waterproofing	sy	2.90	2.60	1.85	2.53	2.09	1.89	1.73
Prot crse for membr waterproofing	sy	4.13	3.98	2.96	2.92	3.25	2.46	4.03
Bit mat, A paving	gal	0.183	0.18	0.162	0.171	0.181	0.184	0.184
T road tar	gal	0.193	0.19	0.22	0.207	0.224	0.246	0.215
T road tar	gal	0.195	0.20	0.20	0.208	0.23	0.257	0.244
Stone filling	cy	3.52	3.79	3.72	4.77	7.34	7.77	5.37
Dry stone paving, joints filled with sand	sy	4.14	4.35	4.46	4.55	5.37	5.83	6.32
Riprap dry	cy	11.53	14.89	9.25	9.42	13.09	13.70	13.97
grouted	cy	12 70	24.51	11.27	20.78	16.29	18.73	17.44
Sheet piling timber	sf	0.81	1.08	0.54	0.94	0.88	1.24	0.71
temporary	sf	0.42	0.50	0.26	0.32	0.40	0.64	0.70
Timber piles, untreated	lf	1.66	1.63	1.47	1.52	2.03	2.32	1.69
creosoted	lf	3.04	2.30	2.74	2.90	3.04	3.37	2.26
Piles, steel bearing:								
10" HP @ 42#	lf	5.00	4.34	3.98	5.31	4.91	5.47	5.11
12" HP @ 53#	lf	5.14	5.07	5.08	6.90	5.36	5.30	4.00
10" WF @ 66#	lf	7.50	4.50	.....	.....	.....	.....	6.50
Conc, 12" x ¼" shell cip	lf	4.15	5.35	4.65	.....	5.78	5.94	5.05
Cleaning existing pave.	mi	146.40	153.88	96.26	124.30	144.43	139.84	112.57
Cleaning existing pave.	sy	0.066	0.13	0.19	0.09	0.058	0.12	0.091
Screened gravel LM	cy	6.65	5.53	4.08	3.46	4.35	5.16	5.06
Broken stone LM	cy	4.38	5.21	5.36	5.24	6.73	6.47	5.27
Stone curb & headers	lf	5.44	4.41	4.75	5.75	4.96	5.10	4.97
Resetting old curb	lf	2.42	2.75	3.47	2.53	2.40	3.23	2.02
Concrete curb Type A	lf	0.74	0.70	.....	.....	.....	.....	.....
Type B	lf	1.44	0.89	.....	.....	.....	.....	.....
Type C	lf	1.80	1.78	1.87	1.97	2.80	2.48	1.51
Type D	lf	1.00	1.59	.....	.....	.....	.....	.....
Type E	lf	2.61	2.25	.....	.....	.....	.....	.....
Type F	lf	0.85	1.12	.....	.....	.....	.....	.....
Reflecting conc curb, 9" W x 9" to 12" deep	lf	0.75	2.75	1.79	1.36	0.92	0.90	1.75
conc mall, 4'0" W x 0-12½" deep	lf	3.07	3.57	3.33	3.50	3.50	5.00	3.50
Concrete gutters	sy	3.79	4.27	4.02	4.51	4.98	5.40	5.14
Catch basins, MH & drop inlets	cy	72.35	68.04	67.36	71.39	70.34	78.13	71.91
Altering MH & CB	ea	28.38	44.58	48.05	43.00	48.00	44.07	49.44
Concrete ROW markers	ea	5.76	6.19	5.00	7.42	8.85	9.24	9.45
Concrete sidewalk, 6"	sy	3.57	3.94	3.66	4.85	4.74	4.79	4.70
Timber & lumber	Mfbm	231.89	212.66	160.04	191.85	221.81	237.00	232.23
stress graded	Mfbm	253.95	235.85	217.64	500.00	301.89	400.00	357.24
creosoted	Mfbm	265.07	268.02	317.27	400.00	332.06	493.29	506.51
Relaying old pipe	lf	1.75	1.97	1.90	2.02	2.23	2.57	2.14
Pneu projected conc	sf of f	1.53	1.59	1.13	1.47	1.73	0.93	1.50
Emuls carbon black	lb	0.102	0.106	0.098	0.120	0.138	0.134	0.111
Highway RR barricade	lf	10.85	6.63	8.86	6.29	8.18	8.14	8.22
Top crse bit mac opt asph cutback road mix	t	4.71	4.43	3.50	4.33	4.10	5.53	4.50
Bit mat A cutback	gal	0.189	0.18	0.16	0.165	0.185	0.191	0.17
ROB gravel fill	cy	2.22	2.34	2.11	1.94	2.35	2.58	2.95
Reflect hwy–RR xing signs	ea	87.50	171.25	205.00	112.50	147.50	202.50	180.56
Top soil, f&p	cy	1.90	2.37	2.86	3.38	3.73	4.16	3.29
Furnishing seed & seeding	acre	246.45	229.55	286.84	325.41g	297.51	325.42	319.92
Ground prep with soil amends fert furn seed & seeding & mulch	acre	489.35	353.40	234.87	368.74	612.91	.....	.....
Sod & sodding furn	sy	1.37	1.50	1.27	1.18	1.27	1.45	1.55
Mulch & mulching furn	acre	142.23	230.07	158.24	65.69h	152.16	200.00	.....
Topsoil from stock piles	cy	1.25	1.10	0.98	0.85	1.02	1.12	1.14

*a Thruway $0.54–1952; $0.73–1953 *b Old standard, $2.41 new standard *c 4 new, lighter & cheaper types of trans jt supports allowed in 1953 *d Lin ft of joint *e Incl 1 contract of 39,100 cy @ $9.47 per cy *f Incl 6 contracts ranging in price from $50.00 to $90.00 per cy *g Incl 1 contract of 100 acres @ $295.00 per acre *h Incl 1 contract of 100 acres @ $55.00 per acre

Canton Land Section Patapsco Tunnel, Maryland

The $5-million contract for the Canton land section of the Patapsco Tunnel under Baltimore's main harbor channel, awarded to Leo Butler Co, is with Maryland State Roads Commission, Norman M. Pritchett, chief engineer. Consultants on the tunnel are Singstad & Bailey of New York, on the whole project J. E. Greiner of Baltimore. This section of the project will provide access to the $29.8 million twin-tube tunnel section already under construction. (See unit prices, ENR 3-31-55, page 104.)

Work on the Canton land section consists of 440 ft of open ramp, 1,025 ft of tunnel, the foundations and first floor of the Canton ventilation building and railroad relocation and temporary bridges. The Canton ventilation building foundations are offline to avoid interference with existing railroad facilities. Most of the work is under water.

Wage rates prevailing in Baltimore include: carpenters $2.75, structural ironworkers $3.325 including fringe benefits, reinforcing ironworkers $3.075, common labor $1.675, electric workers $3.075, all including fringe benefits, tractor operators $2.85-3.00, truck drivers $1.675-1.925.

The bidders include:

1	Leo Butler Co., College Park, Md	$5,030,513
2	Baltimore Contractors, Inc., Baltimore, Md	5,138,652
5	Square Construction Co., Baltimore, Md	5,795,383

Bids: 8-11-55 Items	Unit	Quantity	Unit Prices	
			1C	2
Exc, tunnel structures	cy	159,000	$4.44	$5.00
trenches	cy	5,800	3.50	5.00
Test piles	lf	160	10.70	10.75
Pile load tests	ea	5	2,140	2,150
Cast in place conc piles	lf	75,300	4.80	5.00

Continued on following page

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Patapsco Vehicular Tunnel
Baltimore, Maryland

Continued from preceding page

Bids: 8–11–55		Quan-	Unit Prices	
Items	Unit	tity	1C	2
Concrete, type 1	cy	59,800	28.70	26.00
type 3	cy	3,800	50.00	40.00
Reinforcing bars	lb	4,400,000	0.0965	0.10
Wire mesh	lb	33,600	0.1425	0.15
Pneumatic mortar	sf	1,200	1.40	3.20
Structural steel	lb	3,850,000	0.132	0.11
Castings, steel	lb	5,800	0.355	0.45
iron	lb	22,000	0.265	0.40
Steel curbs, type A	lf	800	5.75	9.00
type B	lf	2,530	2.65	5.00
type C	lf	2,530	4.80	4.30
Misc steel & iron	lb	37,500	0.42	0.80
Dampproofing	sy	1,400	1.45	1.50
Waterproofing, Membrane, 1-ply	sy	9,000	0.95	1.00
4-ply	sy	15,800	3.65	3.80
6-ply	sy	11,000	4.80	5.00
brick in mastic	cy	475	96.00	100.00
cement coat	ls	.....	1,190	1,300
Copper tubing, drains	lb	4,000	4.00	5.00
CIP, cement lined 6" d	lf	12	3.50	6.00
8"	lf	15	5.20	15.00
Galv wi pipe, 2½"	lf	78	1.90	5.00
3"	lf	30	2.40	8.00
4"	lf	1,510	3.20	12.00
5"	lf	30	4.50	15.00
6"	lf	720	5.80	20.00
8"	lf	420	8.60	25.00
Brass pipe, 2½"	lf	142	16.00	18.00
Rigid galv stl cond, 1"	lf	2,900	0.70	1.00
1½"	lf	8,500	1.15	1.00
2"	lf	3,200	1.60	1.50
3"	lf	140	2.60	3.00
3½"	lf	18,300	4.05	4.00
4"	lf	950	4.80	5.00
5"	lf	175	13.80	6.00
Rigid silicon bronze conduit, ¾"	lf	160	3.15	3.00
1"	lf	125	3.95	3.80
1½"	lf	625	5.25	5.00
2"	lf	350	7.45	6.00
3"	lf	200	15.40	9.00
CI boxes, type SL-6	lb	5,300	1.65	2.00
other types	lb	1,750	2.20	2.00
Bare copper groundg cbl	lf	4,700	1.05	1.00
Sixway VC ducts, 3½"	lf	475	3.65	3.00
Asb ebony frame & door, type A	ea	5	230.00	205.00
type B	ea	17	230.00	205.00
type C	ea	4	225.00	205.00
type D	ea	2	225.00	205.00
type E	ea	4	425.00	400.00
type F	ea	1	430.00	400.00
type G	ea	2	430.00	400.00
type H	ea	2	425.00	400.00
Install ceram glaze tile ceiling	sf	38,600	1.07	1.15
wall	sf	10,600	1.34	1.40
Cmt mortar bases	lf	950	1.60	1.70
ceiling coves	lf	2,100	1.60	1.70
Glazed terra cotta curbg f&i	lf	2,200	5.60	6.00
" f&i using veneer	sf	44,650	4.28	4.60
Extra glazed terra cotta blocks, furn & deliver	ls	.....	5,350	5,800
Split vit P gutter ling	lf	2,530	4.00	4.00
Granite masonry	ls	.....	123,900	170,000
Aluminum fences	lf	1,250	34.70	36.00
Street decking	sf	3,500	7.85	3.50
RCP drains, 24"	lf	1,060	9.80	15.00
30"	lf	185	10.80	20.00
36"	lf	1,045	14.25	30.00
Inlets, type A	ea	2	430.00	200.00
Drainage manholes	ea	8	790.00	400.00
CI wtr P, temp loc 3"	lf	170	3.70	5.00
20"	lf	600	15.10	35.00
perm loc 3"	lf	530	2.20	4.00
6"	lf	270	6.00	8.00
20"	lf	530	13.30	30.00
Tile elec ducts, 4½" temp	lf	3,000	3.25	1.00
4½" perm	lf	2,160	4.35	1.00
Maint suppt & protect exist fuel oil P, 10"	lf	65	2.10	50.00
12"	lf	65	2.10	50.00
20"	lf	65	2.80	50.00
Temporary RR bridge #1	ls	.....	14,900	45,000
#2	ls	.....	31,600	70,300
Fill	cy	1,850	3.00	1.50
Pavement, Leland Ave	sy	3,500	3.75	8.00
fire access rd	sy	900	2.70	3.00
Removal, temp reloc & restoration RR tracks	ls	.....	85,075	125,000
CIP, cmt lined 12"	lf	55	7.80	15.00

COMPLETION DATES: Contractor must provide access to river tunnel, through land section in this contract, by October 1, 1956. Liquidated damages $500 per day.

Foundation and first floor of Canton Ventilation Building, part of this contract, must be complete by April 1, 1956, ready to complete building under another contract. Liquidated damages $500 per day.

Entire contract must be completed by March 1, 1957, liquidated damages $100 per day.

Liquidated damages apply separately to each section but in no case can exceed $500 per day in all.

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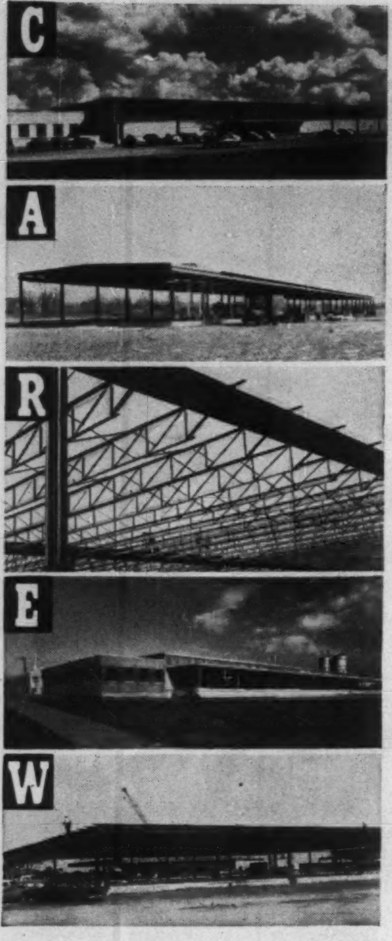

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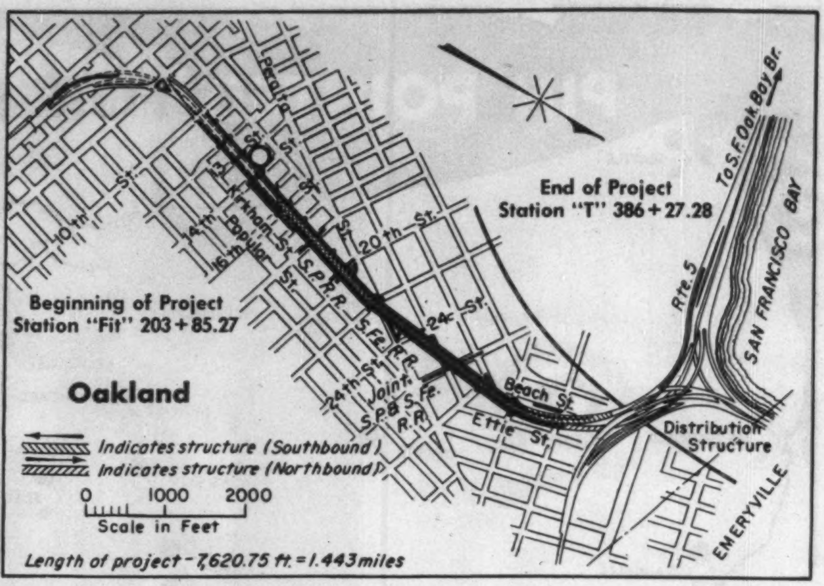


California Double-decks and Prestresses Freeway

The $5.9 million section of Eastshore Freeway on Cypress Street in Oakland will carry four lanes of southbound traffic on the upper level, four lanes of northbound traffic on the intermediate level and provide parking space on ground level beneath the viaduct. On each side, to serve local traffic, 3-lane frontage roads will be built. The elevated roadways extend southerly from the distribution structure along Cyprus Street to Sixteenth Street. From there this contract includes foundations only for another unit that will extend to Tenth Street. But all frontage roads in this contract will be built for the full length to Tenth Street. Major items of work include 56,000 cu yd of concrete in the double-deck, box girder structure, and 17 million lb of reinforcing steel. This is one of the largest single sections of state highway work to be awarded in California. G. T. McCoy is state highway engineer, B. W. Booker is assistant state highway engineer, district IV.

The low of ten bidders, Grove, Shepard, Wilson & Kruge of California, Inc., Seattle, took the contract at $5,878,249, 1.5 percent below the next and 11.5 percent below the high bidder.

"Improvements" to be removed from site include 1- and 2-story frame houses, metal and brick buildings, 1,000-gal underground storage tanks, fencing and spur track.

The state furnishes certain luminaires and finishing enamel. Otherwise the contractor furnishes and installs traffic signal systems, highway lighting and illuminated sign systems.

Concrete caps, 2,020 cu yd, are prestressed. Class A concrete in the bridge structure totals 54,000 cu yd was bid on a lump sum basis to average $45.55 per cu yd.

Equipment rental rates to be paid on force account work ordered by the engineer are shown elsewhere in this issue, in the equipment rental pages.

Minimum wage rates scheduled include asphalt plant engineer $2.845, carpenter $2.775, cement finisher $2.845, electrician $3.075, power shovel operator $3.175-3.285, reinforcing iron worker $2.85, tractor operator $2.845, truck driver, under 4 cu yd $2.10, 4-6 cu yd $2.24, unskilled labor $1.75.

In addition to other forms of insurance or bonds required, the contractor must carry Contractor's Public Liability for damage up to $400,000 and Contractor's Property Damage Liability up to a limit of $100,000.

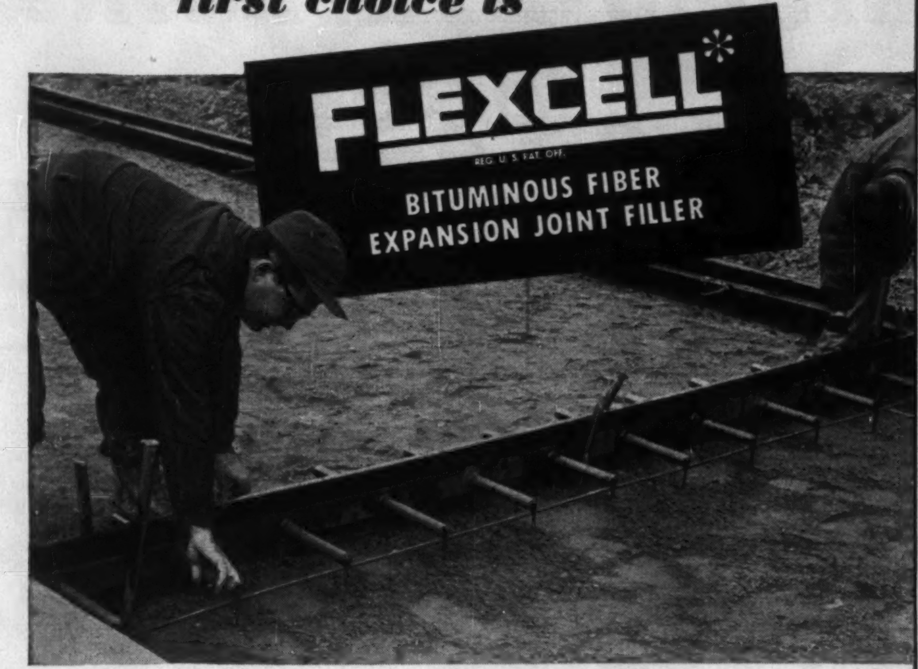
Bidders include:

1C	Grove, Shepard, Wilson & Kruge of California, Inc., Seattle, Washington	$5,878,249
2	M. & K. Corp. & Piombo Const. Co., San Francisco, California	5,955,416
10	Williams & Burrows, Inc. & Carl N. Swenson Co., Inc., San Jose, California	6,637,473

Bids: 7-13-55 Items	Unit	Quantity	Unit Prices 1C	 2
Remove conc, bridge	ls	job	$15,000	$17,000
bridge	cy	280	24.00	20.00
misc.	ls	job	12,000	35,000
pipe railing	lf	875	0.60	0.30
traffic stripes	lf	1,000	0.20	0.18
Remodel steel beams	ls	job	1,200	4,500
Devel wat sup & furn water equip	ls	job	4,000	3,500
Apply water	Mgal	2,530	2.30	1.75
Compact orig ground	sy	85,000	0.05	0.10
Exc. roadway	cy	50,000	0.90	1.20
" structure	cy	22,000	2.50	1.50
Structure backfill	cy	15,700	3.50	2.75
Haul	cy	48,000	0.25	0.16
Imported subbase mat.	miy	45,500	2.00	1.35
Mix, spread & compact CTS	sy	3,100	0.35	0.20
CTB	sy	55,000	0.30	0.22
Portland cement, S & B	bbl	5,520	5.00	4.00
Mineral aggr. C T B	ton	24,500	2.50	2.50
Asphaltic emulsion, AE	ton	109	37.00	30.00
Liquid asphalt, MC-2, curing seal	ton	3	50.00	35.00
Paving asph, P M S	ton	660	7.00	6.00
Mineral aggr, P M S	ton	13,190	7.00	6.00

Continued on following page

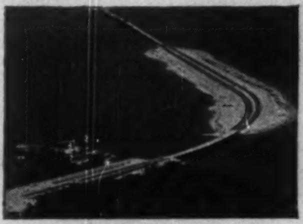
Across America . . . wherever concrete meets concrete . . . first choice is



FLEXCELL*

REG. U. S. PAT. OFF.

BITUMINOUS FIBER EXPANSION JOINT FILLER



• Rickenbacker Causeway

• Cleveland Municipal Airport

• New York State Thruway

• San Francisco-Oakland Bay Bridge

• Detroit Express Highway

These Heavy-Traffic Arteries Stay Maintenance-Free with

FLEXCELL

JOINT FILLER

On bridges and airport runways, on streets, highways, throughways, and expressways . . . *wherever concrete meets concrete* . . . Flexcell Bituminous Fiber Expansion Joint Filler is *doing a job!* For joints that are free from bulges or crevices, that stay closed under severest traffic and climatic conditions, Flexcell Filler has won coast-to-coast acclaim.

In years of trouble-free performance on thousands of projects, Flexcell Joint Filler has proven a cost-saver in both initial expense and freedom from maintenance. Its secret lies in the resiliency of the tough, durable cane fiber board base. Millions of tiny air cells absorb pressure without extruding as concrete expands. When concrete contracts, Flexcell Joint Filler springs back to normal, keeping joint neatly and smoothly closed.

Simple to handle, easy to work with, Flexcell Joint Filler provides neat, finished joints without trimming. It is impregnated with asphalt to resist moisture, and protected by the patented Ferox® Process against dry rot and termite attack. Rough-textured surface means a firmer bond with concrete; it is ideal for work involving special cutting, tapering and fabricating. And over 70% "recovery" has been proved in laboratory tests!

Flexcell Joint Filler has long been specified by leading engineers, contractors, and architects . . . as well as the United States Army and Navy, and other Federal, State, and Municipal agencies. *Before* you start your next job, investigate the reasons for this nationwide preference.

Mail the coupon below for full data on the benefits and economies of using Flexcell Joint Filler for pavements, runways, sidewalks, curbs, gutters, driveways, concrete floors. No cost or obligation.

Another Famous* CELOTEX *Product

FLEXCELL

REG. U.S. PAT. OFF.

BITUMINOUS FIBER EXPANSION JOINT FILLER

The Celotex Corporation, 120 S. LaSalle Street, Chicago 3, Illinois

*Flexcell is a Trademark identifying Bituminous Fiber Expansion Joint Filler marketed by The Celotex Corp.

MAIL COUPON TODAY

The Celotex Corporation, Dept. ENR-95
120 S. LaSalle St., Chicago 3, Illinois

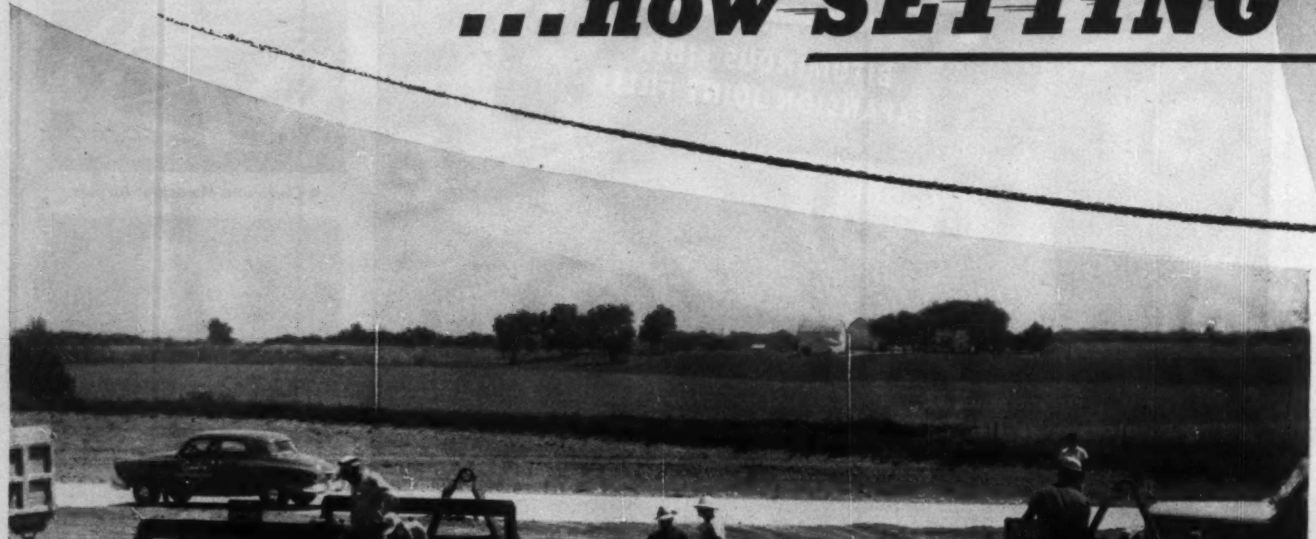
Without obligation, please send me complete data and prices on Flexcell Bituminous Fiber Expansion Joint Filler.

Name____________________

Address____________________

City________________ Zone______ State______

Foremost Turnpike ...now SETTING



First views of the Flex-Plane Portable Finisher at work on the Indiana Turnpike. It is estimated that 60-70% of this toll-road will be Flex-Plane finished.

THE FLEXIBLE ROAD JOINT MACHINE COMPANY

5800 Thomas Road
Warren, Ohio

Finishing Machine
THE PACE in Indiana

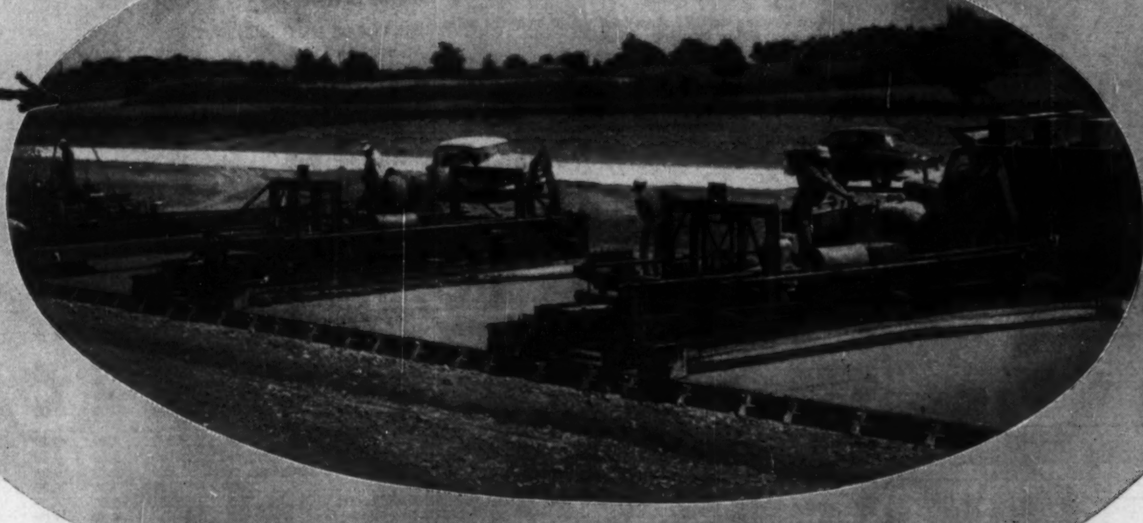
HOOSIER TURNPIKE CONTRACTORS FOLLOWING LEAD OF OHIO PIKE CONTRACTORS...

SPECIFY: *Flex-Plane* FINISHING MACHINES

Almost before your eyes the nation's leading turnpike system is threading its way from New York to Chicago. The first section of the Ohio Turnpike is already open, and the Indiana Turnpike is beginning to take shape. From the Tappan Zee Bridge that crosses the Hudson River in New York State to the fresh concrete now being laid on the Hoosier plain—one piece of equipment is predominate—**the Flex-Plane Finishing Machine.** The reasons: It's the fastest, most flexible machine of its kind marketed today. Its versatility is unlimited—it will work straightaways, variable widths and super elevated curves with equal efficiency; it has all the speed and power needed to keep pace with any paving schedule; its screeds are mounted outside the frame where they should be for best finishing results, ease of crowning and maintenance; it's completely portable, eliminating crane lifting or jacking; its width selection is most advantageous to today's paving requirements.

There's even more—little wonder that it has become America's most popular finisher. See it in action; talk with owners and we're sure you, too, will make your next machine a Flex-Plane Finisher.

This pair of Flex-Plane Finishers are working north of Angola, for the Union Building & Construction Corporation.



WORLD'S LARGEST BUILDER OF CONCRETE FINISHING EQUIPMENT

PERMACRETE

Pre-Cast Crossing Slabs

change "cross" crossings

to smooth, low-cost permanent crossings

Stop unnecessary damage to industrial cars, trucks and cargo with smooth, durable Permacrete pre-cast concrete Crossing Slabs. Time, weather and high-impact traffic play havoc with ordinary railroad crossing materials but Permacrete slabs provide the maximum in strength and safety, coupled with low initial cost and no down time for repairs. Don't settle for less . . . Get Positive Performance with Permacrete.

Get these money-saving facts

Write for new Permacrete bulletin for complete story on economical, easy-to-install concrete crossing slabs.

PRE-CAST PERMACRETE CONCRETE CROSSING SLABS

PERMACRETE PRODUCTS CORPORATION
1839 South Wall Street
Columbus 7, Ohio

Please send me free fact bulletin on low-cost Permacrete Crossing Slabs

Name________________
Position________________
Company________________
Address________________
City________ State________

California Freeway

Continued from preceding page

Bids: 7-13-55 Items	Unit	Quantity	Unit Prices 1C	 2
Screenings, seal coat...	ton	526	7.00	5.50
Sterilizing soil.........	sy	41,100	0.30	0.06
Light weight, P M S...	cy	250	40.00	20.00
Cl B conc pavement...	cy	685	25.00	20.00
Pave tie assemblies....	ea	615	0.60	0.60
Cl B conc, park strips...	cy	1,880	20.00	19.25
Cl A conc, bridge, 54,000 cy...........	ls	job	2,565,000	2,613,000
Prestressed conc caps, 2,020 cy...........	ls	job	101,000	78,000
Rubber waterstops.....	lf	2,900	2.00	1.85
Bar reinf. st, bridge, 8,500 ton............	ls	job	1,445,000	1,500,000
Bar reinforcing steel....	lb	9,800	0.09	0.13
Timber piling, furn.....	lf	6,300	0.70	0.80
drive ...	ea	143	35.00	28.00
Conc piling, furn.......	lf	129,000	3.00	3.30
drive.......	ea	3,843	32.00	33.00
Steel piling, furn.......	lf	5,750	3.50	3.75
drive......	ea	94	65.00	65.00
Splices...............	ea	10	30.00	27.50
Cl B conc, curbs, gutters & sidewalks.........	cy	1,900	33.00	43.00
Chain link fence,				
Type I, 72".........	lf	10,020	1.50	1.50
Type II, 72".........	lf	2,470	1.70	1.60
Walk gates.........	ea	2	60.00	60.00
Gates, 6'...........	ea	40	50.00	55.00
R C P SS, 12".........	lf	1,756	3.50	2.40
15".........	lf	260	4.00	3.00
18".........	lf	560	5.00	3.50
21".........	lf	128	6.00	4.50
24".........	lf	288	7.00	5.00
27".........	lf	644	8.00	6.00
33".........	lf	580	10.00	7.00
36".........	lf	584	11.00	8.50
36", 3,000-D.	lf	24	15.00	10.00
Finishing roadway.....	ls	job	2,500	6,000
Prestress, steel & prestress oper..........	ls	job	95,000	80,000
Misc iron & steel......	lb	145,000	0.33	0.25
Safety railing..........	lf	25,750	4.00	3.80
Type F railing, rem & reset...............	lf	460	2.50	3.00
Remov.............	lf	980	1.20	1.00
Sign frames............	ls	job	10,000	11,000
Detour bridge..........	ls	job	65,000	75,000
Inlets, Type A3........	ea	8	250.00	220.00
Type B3............	ea	4	225.00	160.00
Type D.............	ea	40	270.00	220.00
Type S.............	ea	18	120.00	100.00
Inlet boxes...........	lf	130	40.00	35.00
New manholes.........	lf	122	25.00	35.00
Frame & cov.........	ea	6	60.00	80.00
Metal plate guard rail..	lf	180	3.00	4.00
Asbestos-cement pipe,				
4"...................	lf	836	3.25	2.60
12"...................	lf	6,100	3.70	3.75
Clay sewer pipe, 6".....	lf	28	1.50	1.75
10"...................	lf	168	3.50	3.30
12"...................	lf	2,100	4.00	3.60
24"...................	lf	268	10.00	9.50
Adj MH & CB to grade.	ea	20	45.00	33.00
Install, salv MH frs & cov..............	ea	10	30.00	20.00
Pipe seals............	ea	5	25.00	15.00
Port timber barricades..	ea	64	35.00	30.00
Removing improvements	lf	job	8,000	6,000
Electrical installation...	lf	job	105,000	140,000

*CT cement treated *S subgrade *B base
*PMS plant mixed surfacing *SS standard strength
*AE curing seal, paint binder and seal coats.

Time allowed: start, 15 days from notice of award with completion within 450 working days.

Roadways and Structures for Massachusetts Turnpike

A 5.5-mile section of the Massachusetts Turnpike between Millbury and Auburn drew 11 bidders. The $8.7 million low was six percent under the engineers' estimate, 12 percent under the high and less than two percent below the second low bid. Contract to C. J. Langenfelder & Son, Inc., Baltimore, was awarded by the Massachusetts Turnpike Authority, Philip H. Kitfield, chief engineer.

Work includes construction of two roadways divided by a median, a major interchange, service roadways, altered and relocated roadways, 12 steel stringer bridges, 1 single span, 3 3-span, 7 4-span, 1 5-span, and 5 concrete box culverts, 1 1-cell, 3 2-cell and 1 4-cell.

By consigning all shipments to the Authority the contractor is exempt from the 3% transportation tax. Work will proceed simultaneously by other contractors on adjoining sections of the Turnpike. Owning utilities, corporations and municipalities will remove, furnish and install all poles, wire and cable, gas, water, oil and other pipe lines except as noted in the schedule of unit prices.

All concrete is to be air-entrained by either Method A or C at Contractor's option.

Approved minimum hourly wages include: hoisting engineer $3.40, maintenance engineer $3.025, crane, power shovel, and trenching machine operators $3.40, tractor, bulldozer, and grader operators $3.025, common laborer $1.80, truck driver $1.945, Euclid operator $2.20, pipe layer $1.80.

Bidders include:

1C	C. J. Langenfelder & Son., Inc., Baltimore, Md.	$8,746,884
2	A. I. Savin, E. Hartford, Conn.	8,903,451
11	Central Engineering & Contracting Corp., Durham, N. C.	9,919,136
EE	Massachusetts Turnpike Authority	9,319,710

Completion: 10-31-56, liq damages $200/day

Bids: 6-21-55 Items	Unit	Quantity	Unit Prices 1C	 2
Excavation:				
Clearing and grubbing...	ac	205	$425.00	$700.00
Roadway earth excava...	cy	1,790,000	0.81	0.90
Excava, roadway earth..	cy	967,000	0.87	0.90
Cl A rock............	cy	220,000	0.50	0.30
Peat................	cy	35,000	3.00	4.00
Bridge..............	cy	14,000	1.75	3.00
Cl A trench..........	cy	50	6.00	3.00
Cl B trench..........	cy	7,400	0.75	1.00
Channel.............	cy	2,600	7.00	8.00
Cl B rock............	cy	50,000	0.30	0.20
Borrow, ordinary.......	cy	217,000	1.05	0.60
Gravel..............	cy	5,100	3.00	3.00
Sand................	lf	100	10.00	20.00
Undisturbed dry samples	ea	5	20.00	50.00
Roadway base & surface:				
Cr stone for Mac base...	t	75,700	3.05	4.00
Bitumen for Mac base...	gal	440,000	0.11	0.12
Calcium chloride for road-dust control..........	lb	140,000	0.04	0.03
Bitumen for surf treat...	gal	20,000	0.175	0.16
Cl I bit conc pvmt type I-1	t	47,500	6.75	7.25
Gran rubble block pvmt.	cy	250	16.00	14.00
Structures:				
Steel sheet left in pl.....	lb	497,000	0.14	0.12
Untreated timber piles...	lf	8,300	1.50	1.70
Pile loading test........	ea	1	2,000.00	500.00
Cl A cmt conc msry in footings.............	cy	8,180	28.50	22.75
Cement conc masonry				
Cl A in stems.........	cy	5,740	$46.00	$48.25
Cl A in piers shafts...	cy	4,470	54.00	50.00
Cl A in appr slabs.....	cy	2,430	26.00	20.25
Cl A in all box culv ex Bl Riv culv..........	cy	4,740	47.00	45.00
Cl A in fndn slab for Bl Riv culv............	cy	3,100	25.00	25.00
Cl C for subslab at Dark Brook Res culv.....	cy	800	28.00	25.00
Cl D bridge decks....	cy	6,950	62.00	54.00
Cl D in pipe structs...	cy	380	70.00	80.00
Cl D in median strip at interchange.........	cy	580	25.00	25.00
Cl F in walls & roof slab Bl Riv culv..........	cy	4,350	46.00	43.60
Steel, reinf for struct....	lb	5,371,000	0.105	0.128
Steel, structural........	lb	10,241,000	0.1565	0.15
CIP and fittings.........	lb	9,340	40.00	40.00
Cl & cast steel inlet frames and covers............	lb	8,800	0.40	0.40
WIP and fittings.........	lb	8,100	0.50	0.30
Bituminous dampproofing	cy	7,260	0.80	0.85
Riprap..................	cy	3,120	7.00	6.00
Slope pav for bridges....	cy	13,030	5.00	6.00
Steel rail on conc.......	lf	9,620	8.50	7.00
Alum railing on conc*...	lf	9,620	5.50*	6.00*
Steel piles 10BP57......	lf	13,866	5.50	5.00
Steel file splices........	ea	92	50.00	40.00

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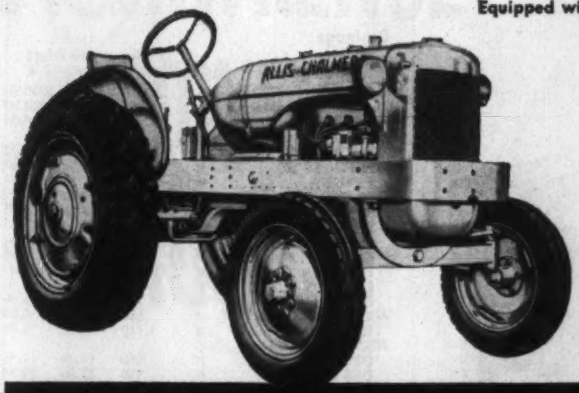
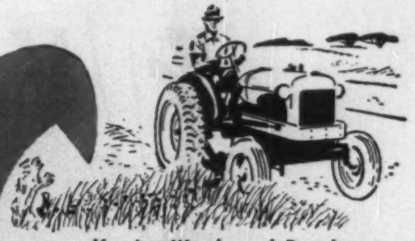
18 Drawbar hp.
Speeds to 8.5 mph
Equipped with lights and starter

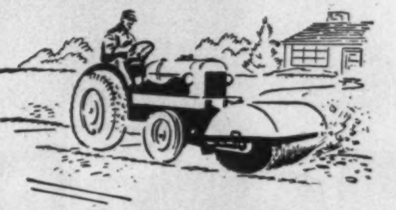


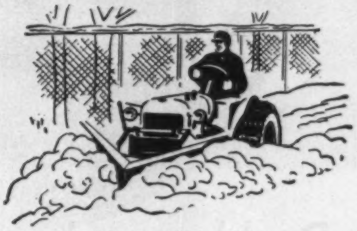
NOW YOU CAN

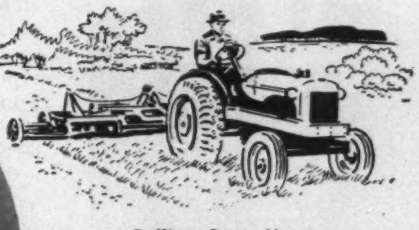
Cut Costs All Year 'Round on All These Jobs

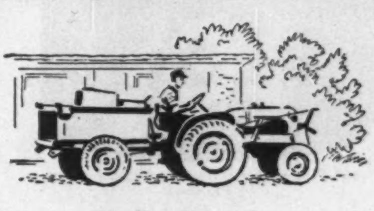
WITH ALLIS-CHALMERS **IB** POWER

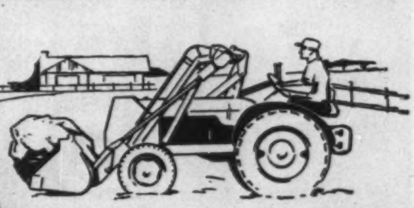

Mowing Weeds and Rough


Sweeping Leaves, Cleaning Walks


Plowing Snow


Pulling Gang Mowers


Hauling Material


Loading, Stockpiling

The hard-working Allis-Chalmers IB Tractor knows no season. With broom, snowplow, crane and sickle bar, it makes an ideal tool.

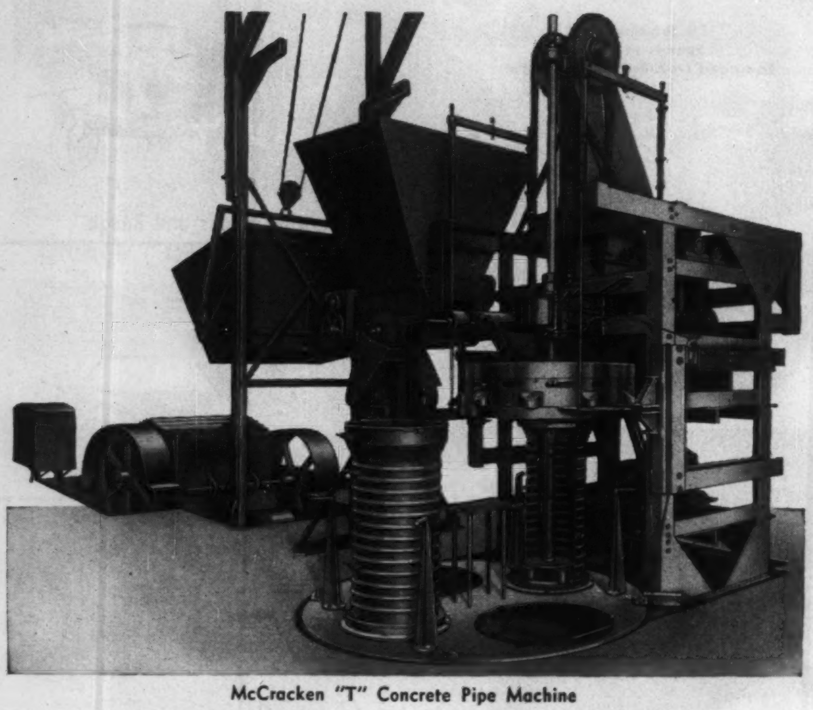
Compact design, short turning radius and low center of gravity enable operator to work quickly, but safely, in close quarters and on steep slopes. Quick-hitch drawbar lets him hook onto and release loads from the seat . . . makes his job easier and safer.

See your nearby Allis-Chalmers dealer and ask him for a demonstration. He'll be glad to *show* you how the IB can help you cut costs *all year 'round.*

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

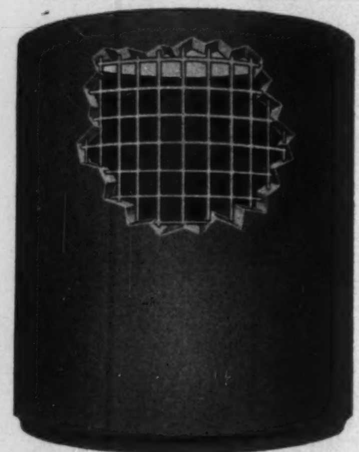
ALLIS-CHALMERS

A-C
ALLIS-CHALMERS



McCracken "T" Concrete Pipe Machine

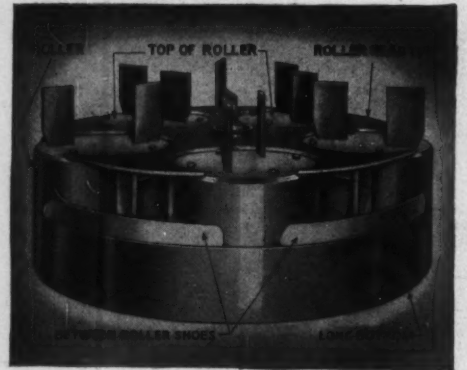
Doubles production of 6" to 36" Pipe



36" Pipe with eliptical steel cage—saves ½ the steel.

Here's the one Machine on the market today that can handle *all* your production from 6" to 24" Bell and Spigot Sewer Pipe (plain) and from 12" to 36" Tongue and Groove Culvert Pipe (reinforced). In footage this range of sizes is 80% of the market.

These are the *small sizes* in which *machine-made* production and its resulting economies are essential to compete. This Model "T" Machine offers important savings ranging from 50% on the smaller down to 10% on the larger sizes. It doubles production—needs no Pallets and saves extra handling of B&S Pipe—permits handling double the business with half the inventory.



ONE 8-HOUR SHIFT PRODUCES:

PLAIN PIPE	SIZE OF PIPE	REINFORCED PIPE
2400 feet	4" to 12"	- - - -
1750 feet	12" to 18"	1600 feet
1200 feet	21" to 24"	1100 feet
- - - -	30" to 36"	900 feet

Exclusive Roller-Head, used in sizes 12" to 36", packs the 4" wall of 36" pipe like a Packer-Head packs the 1" wall of 10" pipe.

WRITE FOR DETAILS

CONCRETE PIPE MACHINERY CO.

10 GEORGE STREET • SIOUX CITY 17, IOWA

Massachusetts Turnpike

Continued from preceding page

Drainage:

Items	Unit	Quantity	Unit Prices	
			1C	2
Drop inlets, type D-2	ea	4	$275.00	$250.00
Drop inlets, type D-3	ea	298	275.00	250.00
Manholes	ea	1	300.00	250.00
CB & MH, change in type incl new MH fr & cov.	ea	1	200.00	200.00
RCC Pipe SS 15"	lf	9,100	4.50	4.20
SS 18"	lf	950	5.10	5.00
SS 30"	lf	60	11.50	9.00
SS 36"	lf	700	13.00	11.00
SS 42"	lf	270	15.00	14.50
SS 54"	lf	270	23.00	22.50
ES 24"	lf	150	9.75	8.00
ES 36"	lf	610	14.50	12.00
ES 42"	lf	130	17.50	14.50
ES 48"	lf	130	20.00	18.00
ACCM Pipe 16 gauge, 15"	lf	960	5.90	6.25
16 gauge, 18"	lf	1,110	6.60	8.00
RCC Pipe				
DES 36" 5,000D	lf	660	18.00	17.00
DES 42" 5,000D	lf	480	22.50	22.00
CIP undrdr with 8" cradle invert	lf	5,000	5.00	4.50
P culv rem and stacked	ls	1	2600.00	1500.00
Grt cobble stone pav, waterways	sy	900	6.50	7.00
Bit mix pav, waterways	sy	5,920	3.00	3.00

Guards and fencing:

Indiv conc posts, square	ea	10	9.00	8.00
Highway guard, C3S	lf	32,000	1.90	1.70
Anchors, end, C3S	ea	77	50.00	45.00
C3C	ea	4	50.00	45.00
C2C	ea	4	33.00	45.00
Anchors, intermed, C3S	ea	82	51.00	45.00
Anchor assemb, bridge	ea	48	27.00	20.00
Hwy grd, steel beam, single face	lf	20,000	2.75	2.70
rem & reset	lf	1,300	1.00	0.90
anchors rem & reset	ea	10	15.00	15.00
posts rem & reset	ea	10	3.50	4.50
Fence, stock	lf	48,500	0.60	0.50
gates, stock	ea	10	35.00	35.00
chain link, 48"	lf	17,000	1.90	2.15
barrier	lf	300	9.80	8.00

Curbs:

Gran curb				
VA4, str 6"x18"	lf	3,100	$3.25	$5.10
curv, 6"x18"	lf	500	4.75	7.00
VA5, str 6"x9½"	lf	15,950	4.00	5.00
curve, 6"x9½"	lf	100	6.00	8.00
corners	ea	10	25.00	35.00
Gran edg type SB, 6"x12"	lf	22,600	2.00	2.00
Gran faced precast				
curb, 6"x18"	lf	72	3.50	7.00
transition	lf	72	4.00	10.00
Curb removed and reset	lf	550	2.00	2.00
inlets rem & reset	ea	2	20.00	50.00
corners rem & reset	ea	2	15.00	50.00

Structures at crossings:

Conc sidewalks, 1-crse	sy	300	4.50	6.00
Bounds furn & set	ea	130	20.00	20.00
Bounds rem and reset	ea	5	18.00	15.00
Elec ducts and MH at				
Bridge K4	ls	1	3,000.00	6,000.00
Bridge K5	ls	1	4,500.00	8,200.00
Bridge K6	ls	1	3,200.00	7,000.00
Bridge K9	ls	1	5,550.00	11,000.00
Bridge K11	ls	1	2,800.00	6,000.00
Bridge K12	ls	1	2,500.00	5,000.00
Bridge K15	ls	1	8,500.00	7,000.00
Tele and Fire alarm ducts and MH at Bridge K2.	ls	1	9,500.00	8,500.00
Bridge K4	ls	1	2,500.00	7,000.00
Bridge K5	ls	1	3,300.00	22,000.00
Bridge K6	ls	1	4,400.00	10,000.00
Bridge K9	ls	1	6,600.00	15,800.00
Bridge K10	ls	1	3,800.00	7,000.00
Bridge K11	ls	1	3,000.00	8,000.00
Portable office bldg	ea	1	3,000.00	4,000.00
Portable building with sanitary facilities	ea	1	4,000.00	4,000.00

Seeding and sodding:

Loam borrow	cy	20,000	$1.30	$2.00
Loam rehandled & spread	cy	16,000	1.10	1.20
Peat rehandled & spread	cy	25,000	1.20	1.20
Seeding	sy	470,000	0.07	0.07
Field sodding	sy	6,300	1.10	1.20

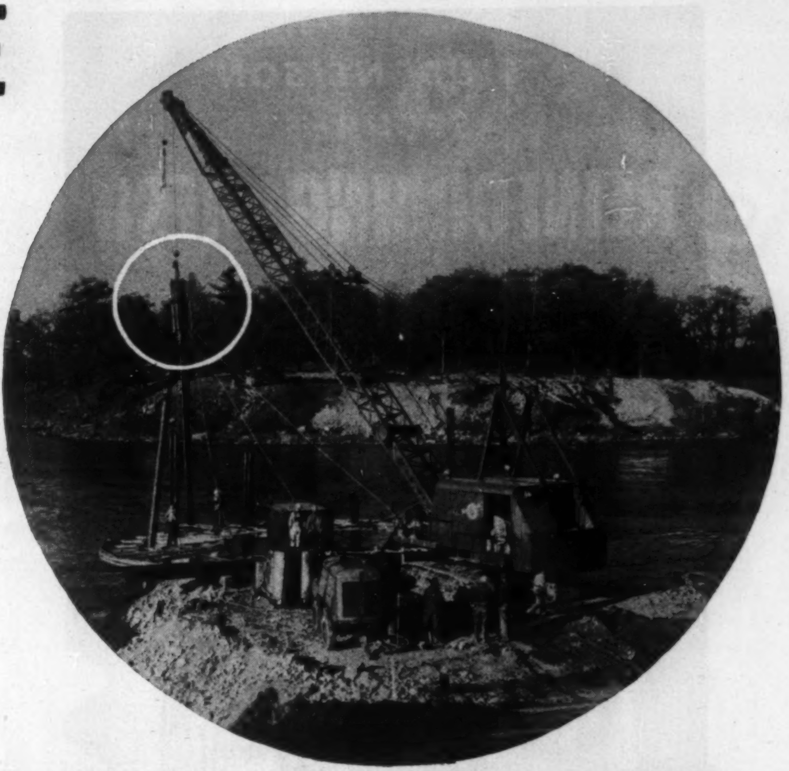
Water lines:

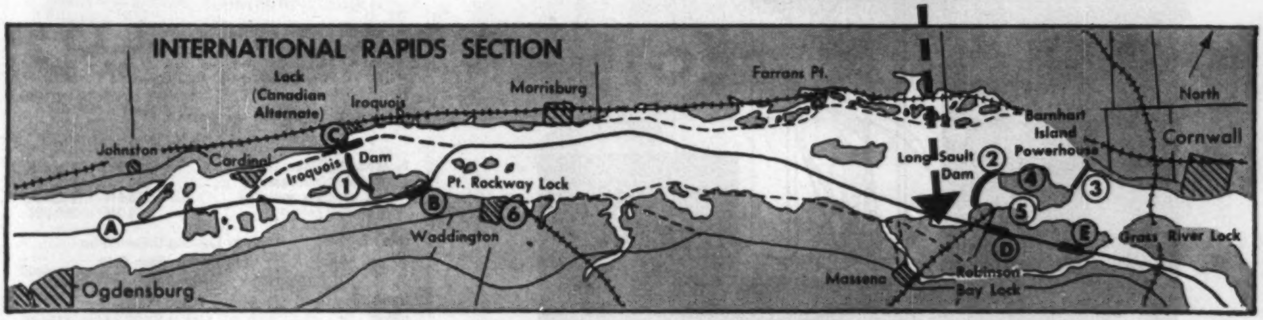
CI water main B&S, cmt lined				
CI 150, 8"	lf	1,000	6.00	6.00
CI 150, 6"	lf	970	7.00	5.00
CI 250, 8"	lf	2,050	6.80	6.50
CI 250, 6"	lf	290	6.50	5.50
Hydrants furn & instal	ea	1	500.00	250.00
Hydrants rem & reset	ea	2	225.00	200.00
Copper tube, type K, ¾"	lf	330	3.30	2.00
Temporary service, 4"	lf	1,000	4.25	2.00
Gate & gate boxes, 8"	ea	6	275.00	200.00
6"	ea	5	250.00	150.00
Curb cock and box	ea	17	50.00	25.00
Corporation cock	ea	17	30.00	20.00
Water pipe insul, 8"	lf	200	8.00	3.00
6"	lf	350	6.50	3.00
Steel casing, 18"	lf	330	12.00	10.00

Continued on following page

ST. LAWRENCE POWER PROJECT

started with blows by a McKIERNAN-TERRY Pile Hammer




INTERNATIONAL RAPIDS SECTION
Lock (Canadian Alternate)
Iroquois
Morrisburg
Farrans Pt.
North
Barnhart Island Powerhouse
Cornwall
Johnston
Cardinal
C
Iroquois
Dam
1
Pt. Rockway Lock
B
6
Long Sault Dam
2
4
3
5
A
Waddington
D
E
Grass River Lock
Ogdensburg
Massena
Robinson Bay Lock

By 1959, the St. Lawrence River, between Ogdensburg and Massena, N. Y., will be delivering more than 12½ billion kilowatt-hours of electric energy per year by means of hydroelectric plants served by 3 dams.

The first major contract for this huge undertaking was started by Dravo Corporation at the foot of Long Sault Island near Massena late in 1954. As the first step in diverting the south channel of the river to permit building one of the dams, a McKiernan-Terry 9B3 Double-Acting Hammer was used to set the initial piling for a cofferdam.

Here, as in many thousands of large and small projects all over the world—wherever stabilization is required for foundations—the contractor selected McKiernan-Terry Pile Hammers to speed the work and help assure a creditable, profitable job.

McKIERNAN-TERRY CORPORATION

80 Richards Avenue, Dover, New Jersey

Manufacturing Engineers • Plants: Harrison, N. J., Dover, N. J.

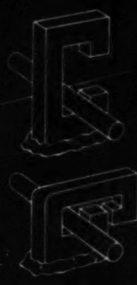
McKIERNAN TERRY

Also Manufacturers of Coal and Ore Unloaders and Bridges, Grab Buckets, and Special Machinery

MK-364

"STUD" NELSON
SECURES
REINFORCING MESH
IN A FLASH!

In one effortless instant the NELWELD® gun securely fuses a rectangular stud to a steel member. Wire is then placed in the T slot of the stud where a few quick blows with a hammer permanently clamp the mesh in place. Securing wire mesh for guniting, fireproofing columns, special linings, etc. is a simple matter with the NELWELD® System.



RECTANGULAR STUD BEFORE AND AFTER WIRE IS SECURED

In addition, NELSON rectangular studs are successfully used to secure steel reinforcing, expanded metal lath and similar materials.

Consult your Nelson Field Engineer. He'll be glad to weld rectangular studs on the job to demonstrate this fast economical means of fastening. He can also discuss NELWELD® short cuts as they apply to your specific construction problems. Write for details.

Stud Nelson

Fasten it Better
at Less Cost
with

NELWELD®

NELSON STUD WELDING
2744 Toledo Avenue
Lorain, Ohio

Please send more information on cost saving NELWELD construction applications.

NAME ____________________

COMPANY ____________________

ADDRESS ____________________

CITY AND STATE ____________________

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

Massachusetts Turnpike

Continued from preceding page

Structures at crossings:

Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Plate load tests, unconf.	ea	2	1,000.00	1,000.00
Steel piles, 10BP 42	lf	2,234	5.00	5.00
Tele and fire alarm ducts and MH at				
Bridge K12	ls	1	4,000.00	7,000.00
Bridge K14	ls	1	3,100.00	10,000.00
Tele ducts & MH, at				
Bridge K15	ls	1	5,200.00	8,000.00
under turnpike	ls	1	2,400.00	6,000.00
under turnpike	ls	1	3,500.00	8,000.00
Tele ducts, Leicester St.	ls	1	7,200.00	12,300.00

* Alternate accepted on price basis.

Concrete classes: minimum compressive strength in lbs per sq in at 28 days. *A 3,000 *B 2,500 *C 2,000 *D 3,000 *E 3,000 *F 3,500

Roadway Lighting for Kentucky Turnpike

Alternate bidding on aluminum, concrete and steel poles enlivened May 17 letting for lighting materials and equipment for the Kentucky Turnpike now under construction from Louisville to Elizabethtown. D. H. Bray is state highway engineer handling the work and Howard, Needles, Tammen & Bergendorff, Kansas City, Mo., are the consultants.

Bidders included:

1C	Marine Electric Co., Inc., Louisville, Ky.	$215,208†
2	Thompson-King-Tate, Inc., William Hepburn & Co., Lexington, Ky.	213,765#
4	Joe H. Hayes Electric Co., Inc., Louisville	303,034*

Alternate bidding on poles

	1C	2
Roadway lighting	$103,933	$123,838
With aluminum poles	215,208†	216,145
With concrete poles#	206,910	213,765#
With steel poles*	204,046*	215,282

Bids: 5-17-55 Roadway Lighting Units—Poles

Unit Prices—Each Pole

		†Aluminum		#Concrete		*Steel	
Items	No	1C	2	1	2	1	2
LBLP	81	$483	$399.46	$451	$382.72	$429	$396.05
LBMP	12	457	378.13	440	377.11	415	381.07
LBSP	6	438	352.44	434	374.74	405	361.48
SBLP	93	475	391.20	441	376.26	425	389.25
SBMP	9	450	369.85	426	370.28	411	374.25
SBSP	5	431	357.40	419	346.12	401	363.19
Duplex	10	697	574.87	661	521.44	618	566.42
OHsgn	5	1,338	1,210.47	1,002	1,376.67	1,309	1,114.70

*L long *M medium *S short *B bracket
*P pole *OHsgn overhead sign support

Roadway lights, cable & conduit

Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
Parking lot light	ea	1	$220.00	$160.18
Power connections	ea	4	735.00	385.42
Sign spot lights	ea	5	24.00	38.45
Fluoresc type lghtg units	ea	8	286.00	257.62
Lighting cable, multiple circuit, insulated & neutral,				
#2 AWG	lf	3,450	1.95	2.33
#4 AWG	lf	16,850	1.80	2.19
#6 AWG	lf	15,750	1.68	2.08
#8 AWG	lf	12,800	1.60	2.01
#12 AWG	lf	650	0.13	0.36
Concrete-encased duct	lf	1,863	4.50	5.58
Rigid conduit: 3" ϕ galv	lf	1,075	3.30	3.40
3/4" ϕ galv	lf	480	0.90	0.63
Junction boxes	ea	8	38.00	48.95
Marker lights	ea	10	80.00	70.07
Glare shields	ea	32	20.50	15.56
Cable, pre-assembled	lf	160	1.00	1.36

Toll Recording Equipment

Toll collecting equipment for the 40-mile Kentucky Turnpike will cost $66,180. This includes furnishing and installing complete equipment for registering, recording and signalling toll collections and for automatically counting traffic axles moving through the toll plazas.

Bidders include:

1	IBM (lump sum only, therefore disqualified)	$60,000
2C	Taller & Cooper, Inc., Brooklyn 1, N. Y.	66,180

Bids: 5-27-55 Items	Unit	Quantity	2C Unit Price
Mechanical toll registers	ea	14	$1,865
Remote printing recorders	ea	4	3,000
Toll paid indicators	ea	12	350
Overhead classification indicators	ea	12	300
Axle counting treadles	ea	18	225
Treadle frames	ea	16	175
Static eliminators	ea	12	15
Power supply	ea	2	500
Toll booth counter	ea	12	720
Drawer bank	ea	2	1,700
Master clock	ea	2	100

Lump sum bid did not comply with specifications

Road Signs for Kentucky

The variety and cost of signs for guiding the customers of Kentucky's new Turnpike between Louisville and Elizabethtown are shown below. Work is for the Kentucky Department of Highways, D. H. Bray, state highway engineer. Howard, Needles, Tammen & Bergendorff, Kansas City, Mo. are the consulting engineers.

The bidders were:

1C	Minn. Mining & Mfg. Co., St. Paul, Minn.	$73,700
2	Elastic Stop Nut Corp. of America, AGA Div., Elizabeth, N. J.	81,870
3	Federal Sign & Signal Corp., Chicago, Ill.	89,622

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1C	2
Fabrication of sign by type				
A 0.125-in sheet aluminum	sf	2,700	$2.98	$4.00
A 0.162-in sheet aluminum	sf	800	3.77	4.50
A structural panel	sf	3,600	4.63	5.50
B structural panel	sf	2,300	5.31	4.40
C 0.125-in sheet aluminum	sf	170	2.12	3.00
C structural panel	sf	100	3.22	4.25
Aluminum letter, cutouts, 6"	ea	150	0.793	1.00
Timber posts, 4"x6", f & e	lf	5,100	2.11	3.35
4"x6", f	lf	1,050	0.45	0.60
6"x6", f & e	lf	1,400	2.72	3.61
6"x8", f & e	lf	1,350	3.10	4.00
Steel post U, f & e	lf	620	1.28	0.70
f	lf	580	0.40	0.30
8WF13, f & e	lf	760	4.64	4.30
Overhead sign, f & e	ea	1	600.14	340.00
Sheet aluminum signs, e	sf	2,700	1.31	0.40
Struct panel signs e	sf	6,000	0.84	0.50

1	Minn. Mining & Mfg. Co., St. Paul, Minn.		$39,919 S
		C	41,203 A
2	Federal Sign & Signal Corp., Chicago, Ill.		56,296 S
			58,552 A

• A based on aluminum structural panel. • S Based on steel structural panel.

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1C	2
Fabrication of signs by type				
A 0.125-in sheet aluminum	sf	2,700	$2.98	$4.65
A 0.162-in sheet aluminum	sf	800	3.77	5.45
C 0.125-in sheet aluminum	sf	170	2.12	4.15
Aluminum letter cutouts, 6"	ea	150	0.793	2.10
Overhead sign, f	ea	1	458.97	415.00
Fabrication of signs by type				
A aluminum struct panel	sf	3,600	4.63	5.61
B aluminum struct panel	sf	2,300	5.31	8.50
C aluminum struct panel	sf	100	3.22	4.55
A steel struct panel	sf	3,600	4.50	5.15
B steel struct panel	sf	2,300	4.96	8.25
C steel struct panel	sf	100	3.11	4.30

1	Minn. Mining & Mfg. Co., St. Paul, Minn.		$47,186s
			36,086a
2	Federal Sign & Signal Corp., Chicago, Ill.		31,490s
		C	31,070a
3	United Advertising Corp., Newark, N. J.		63,353s
			58,853a

• a using aluminum structural panel signs erected
• s using steel structural panel signs erected

Continued on following page

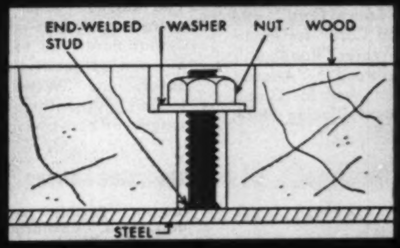
"STUD" NELSON SECURES

WOOD NAILERS

IN A FLASH!

Looking for a faster, less costly way to fasten wood nailers to steel?

You'll find the answer in NELWELD® — the trigger-quick method of end welding fastener studs to steel. It makes the securing of wood nailers as simple as A-B-C . . . (A) Weld Nelson thread studs to steel member, (B) Lay nailer over studs and strike with hammer, giving stud locations, (C) Drill wood and assemble. An alternative method is to pre-drill wood and weld studs through holes in nailers.



NELWELD does the job at a fraction of the cost involved in punching or drilling and through-bolting.

Next time you think of wood to steel, think of NELWELD. Then call a Nelson Stud Welding expert to co-engineer the fastening into your design. You'll find him as serious as you are reducing costs. Mail the coupon for complete information.

Stud Nelson

Fasten it Better at Less Cost with

NELWELD

NELSON STUD WELDING
2742 Toledo Avenue
Lorain, Ohio

Please send more information on stud welding nailers, and other cost-saving construction applications.

NAME ____________________

COMPANY ____________________

ADDRESS ____________________

CITY AND STATE ____________________

NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

*Make GOODALL Your Buy-Word . . .

AND KEEP THE JOB *MOVING!*

*Goodall hose, belting, footwear and clothing have been used as standard equipment by contractors for many years. Such continued confidence in Goodall products can only be credited to reliable performance and economy in service. Many items in the "Cloverleaf" Line were originally developed specifically for the Contractor, and still lead the field in helping to keep the job moving under severest working conditions. Make Goodall your *buy*-word . . . and profit by the quality, reliability and economy which the name assures.

HOSE—

Keep the job moving by using hose that is built to *stand up longer* under conditions that would soon send ordinary hose to the scrap pile. For Steam-"Inferno", "76" and "Long Life". For Air-"Subway", "Brown Cord", and "Mine King", with "Allgood Cord" for manifolds and caissons. For Water-"Roadbuilders", "Buckskin" and "Bellwood"; "Allgood Jet" and "Newtype" Suction. And for Grout, Concrete Placing and Cement Placing Hose, your *best buy* is "Goodall."

BELTING—

Keep the job moving with belting that's built to safely handle the longest, heaviest hauls . . . that assures steady performance, free from shutdowns for repairs. "Super Triple-S" Conveyor Belting has an unequalled reputation for strength and stamina on some of Construction's toughest assignments, with "Triple-S" and "La Crosse" running close seconds. "Wear King" Mucker Belts have broken all records for tonnage handled before replacement. For Elevator Belting, its "Super Triple-S", and for Grader Belts, "76".

CLOTHING and FOOTWEAR—

Keep the job moving by having your men equipped for the wet-work and wet-weather jobs with clothing and footwear that provide fullest protection with maximum comfort. The Goodall Line includes coats, jackets, overalls and suits—Rubber, Latex and Oiled—that never fail to demonstrate their *extra* measure of quality. Among the boots, "Toe-Saver" and "Wear King" are outstanding leaders in quality, comfort, protection and long-wear economy.

The "TOE-SAVER" (R) BOOT

Smooth, flexible black rubber, duck lined. Comfortable cushion insole. Tire-Tread outer sole. White cap over reinforced steel safety toe that's tested to withstand 2,000 lbs. pressure.

Short, Storm King and Full Hip lengths, with permanent size markings.

— • —

Other Goodall protection-with-comfort items include work shoes, pacs and rubbers; "Hardboiled" Safety Hats and other headgear; and a variety of work gloves.

Mail Coupon for Details and Prices

GOODALL RUBBER COMPANY Date..............................
460 Whitehead Road, Trenton 4, N. J.
Please send literature and prices on the following:
☐ HOSE: .... (Type or Service) ☐ BELTING: .... (Type or Service)
☐ CLOTHING and FOOTWEAR—Complete Line. ☐ Send Salesman from your nearest Branch.
Company ....
Addresss ....
Attention of Mr.............................. Title..............................

GOODALL RUBBER COMPANY
GENERAL OFFICES, MILLS and EXPORT DIV., TRENTON 4, N. J.—Est. 1870.
Branches and Distributors in Principal U. S. Cities and in Canada.

Road Signs for Kentucky

Continued from preceding page

Bids: 7-7-55 Items	Unit	Quantity	Unit Prices 1	2C
Timber posts, f & e, 4"x6"	lf	5,100	$2.34	$2.10
f 4"x6"	lf	1,050	0.50	0.42
f & e, 6"x6"	lf	1,400	3.02	2.30
f & e, 6"x8"	lf	1,350	3.46	2.50
Steel post U, f & e	lf	620	1.42	1.65
f	lf	580	0.44	0.75
8WF 13, f & e	lf	760	5.15	6.25
Erecting overhead sign	ea	1	156.86	90.00
Sheet aluminum signs e	sf	2,700	1.46	1.38
Struct panel signs e, steel	sf	6,000	2.78	0.62
aluminum	sf	6,000	0.93	0.55

Low Bids in New Mexico

Average unit prices on low bids from Jan 1-June 30, 1955 New Mexico State Highway Department.

Bids: 1st half 1955 Items	Unit	Quantity	Average Unit Price
Remov & rebuild fence	lf	142,402	$0.168
Excavation unclas	cy	1,659,027	0.444
for structs, rdwy	cy	2,716	1.77
bridge	cy	1,953	3.69
pipe culverts	cy	23,449	1.53
Borrow, selected	cy	563,032	0.17
Ordinary	cy	208,434	0.21
Watering	Mgal	180,145	0.65
Rolling, tamping roller	hr	15,808	5.83
pneumatic tired	hr	34,754	4.07
steel tired	hr	11,653	6.58
Equip operation roller	hr	297	13.41
50-ton roller	hr	750	12.00
Mechanical tamping	hr	13,508	5.12
Station yard overhaul	stayd	3,610,474	0.015
Quarter mile yard haul	¼miyd	2,030,357	0.039
Ton mile haul	tml	2,325,705	0.052
Obliterating old road	mi	8.1	211.42
Grading	mi	61.916	1,310
Blading & reshaping	mi	47.400	283.18
Contour ditches	lf	153,800	0.071
CMP underdrains perf galv 8"	lf	1,280	3.00
Mortar rubble masonry	cy	1,387	30.03
Excav for struct walls	cy	600	2.00
Grouted riprap cl A	cy	60.88	18.90
Wire enclosed riprap	cy	1,485	10.11
Wire fabric	lb	28,658	0.29
Excavation for riprap	cy	522	4.63
Steel stakes	lf	1,200	3.00
Cattle guards, 12′ rdwy	ea	3	1,333
18′ rdwy	ea	1	1,500
24′ rdwy	ea	51	1,713
Steel plate guard fence type A	lf	1,315	3.00
Galv barbed wire fence	lf	340,521	0.164
Bracing	ea	619	8.50
Gates Texas type	ea	89	17.92
Standard type	ea	43	40.47
ROW markers	ea	1,620	6.65
Std FAP markers type I	ea	35	60.14
type II	ea	9	70.56
Trtd timb warn posts, refl, 6" φ	ea	1,859	6.54
Selected borrow sub-base	t	162,175	0.45
Gradation sub-base controlled	t	404,773	0.67
Crushed quarry rock 3" max	t	66,950	1.00
Base course	t	595,832	0.80
Stockpile base course	t	4,000	1.31
Crushed quarry rock 1" max	t	20,800	2.00
Filler material	t	7,085	0.75
Bit matl, typ-SC-4 (for asph process base)	bbl	1,705	6.75
type MC-1	bbl	32,324	6.16
type MC-3	bbl	23,315	6.07
type SC-4 road mix	bbl	16,010	5.18
Mineral aggregate, rdmix	t	83,575	1.05
Mixg bit matl & aggr	mi	88,881	651.36
Bit matl, type RC-4	bbl	1,265	6.20
MC-5	bbl	12,675	5.65
200-250	bbl	1,170	6.24
120-150	bbl	15,795	5.84
Cover material	t	51,927	4.04
5/8"	t	4,685	4.90
1/2"	t	2,330	5.30
Stockpile 3/8" gradation	t	1,000	2.00
Bit matl typ 120-150, median	bbl	50	6.50
Cov matl, median	t	100	5.00
Bit matl typ 120-150, shoulder	bbl	585	6.50
Cov matl, shldr trtmnt	t	960	3.00
Plant mix surface course	t	115,222	3.55
Bit matl, typ 85-100, hot plant	bbl	7,144	6.22
85-100	bbl	37,057	4.96
85-100, tack coat	bbl	2,644	6.45
SC-5	bbl	1,127	6.92
SC-4, shldr trtmnt	bbl	325	6.72
SC-5	bbl	1,115	7.82
120-150	bbl	5	6.50
Mineral aggregate	t	5,015	2.82
Sand	t	130	3.00
Concrete, cl A	cy	4,793.91	51.43
Cl A bridge substruct	cy	860.30	62.37
Cl A bridge suprstruct	cy	1,083.30	62.94
Cl B	cy	333.33	46.67
Cl A for blanket ditch lining	sy	2,276.95	7.55
Conc, precst brdg units	cy	305.08	98.69
Light std bases, cl A	cy	49	75.00
Cut-off walls, cl B	cy	260	40.22
Reinf for conc structs	lb	842,730	0.135
Wire fabric for conc	lb	9,563	0.252

Continued on following page

THREE '56 BUCKEYES!

...Alive with big features from Wheel Hoist to Crawlers

Buckeye's new "O" series now includes 3 models, the 305, 307 and 308 — each one with new, exclusive features for smooth, clean, low-cost ditching — each one built to outperform any machine in its class!

Live Hydraulic Wheel Hoist!

For faster, more accurate positioning of digging wheel independent of all other functions. Easily operated from the seat by simple, one-hand controls. Lets operator work faster, more profitably!

Hydraulic Conveyor Drive!

Forward or reverse in 3 speeds to meet any conveyor need . . . Eliminates shock damage found when driven mechanically from digging wheel drive . . . Completely controllable from the seat.

Tractor Type Crawlers!

Allow variation in tread width and bearing areas thru a selection of pads specifically suited to any type digging . . . Idler rollers have face-type seals for long life... Strong, sturdy and reliable!

See the New "O" Series

BUCKEYE

...at Your Distributor!

Product of GAR WOOD GW INDUSTRIES

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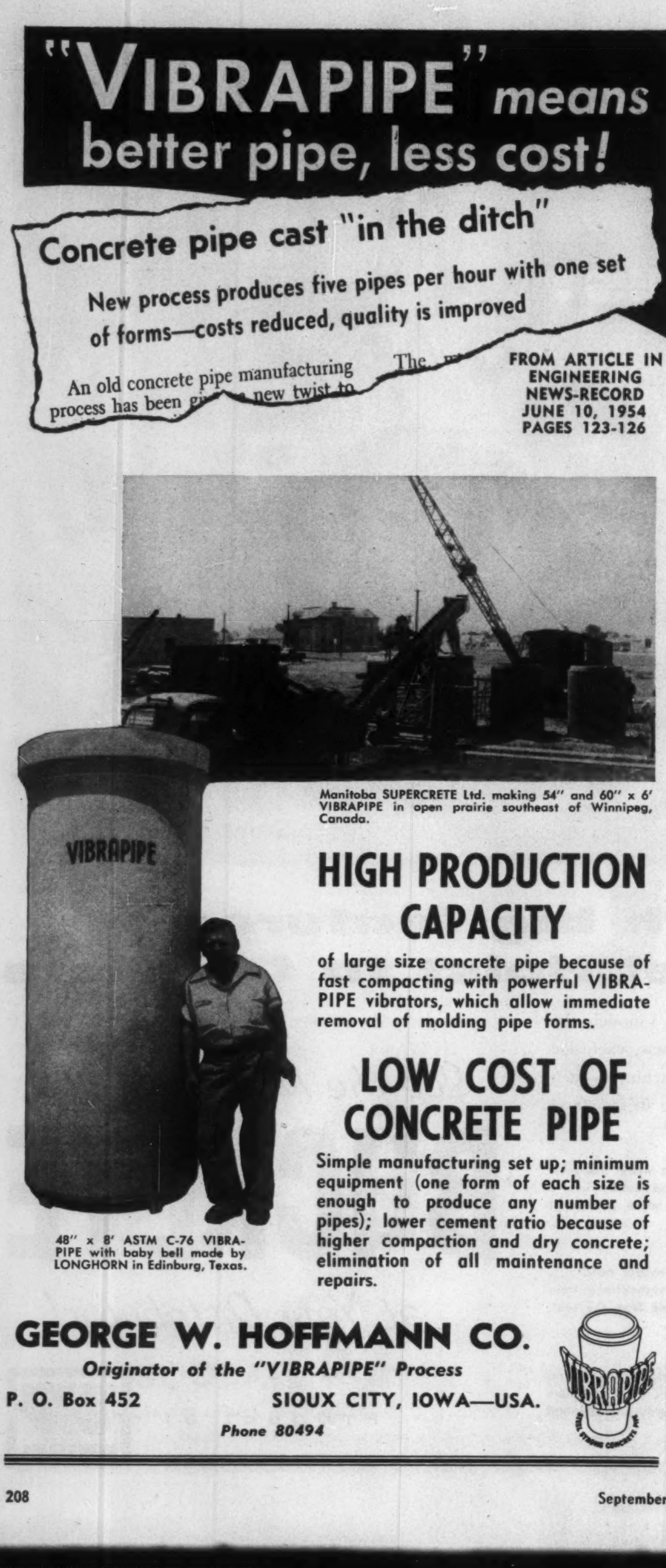

"VIBRAPIPE" means better pipe, less cost!

Concrete pipe cast "in the ditch"

New process produces five pipes per hour with one set of forms—costs reduced, quality is improved

An old concrete pipe manufacturing process has been gi a new twist to The

FROM ARTICLE IN
ENGINEERING
NEWS-RECORD
JUNE 10, 1954
PAGES 123-126

Manitoba SUPERCRETE Ltd. making 54" and 60" x 6' VIBRAPIPE in open prairie southeast of Winnipeg, Canada.

48" x 8' ASTM C-76 VIBRAPIPE with baby bell made by LONGHORN in Edinburg, Texas.

HIGH PRODUCTION CAPACITY

of large size concrete pipe because of fast compacting with powerful VIBRAPIPE vibrators, which allow immediate removal of molding pipe forms.

LOW COST OF CONCRETE PIPE

Simple manufacturing set up; minimum equipment (one form of each size is enough to produce any number of pipes); lower cement ratio because of higher compaction and dry concrete; elimination of all maintenance and repairs.

GEORGE W. HOFFMANN CO.
Originator of the "VIBRAPIPE" Process
P. O. Box 452
SIOUX CITY, IOWA—USA.
Phone 80494

Low Bids In New Mexico

Continued from preceding page

Bids: 1st half 1955 Items	Unit	Quantity	Average Unit Price
Reinf for conc pave	lb	27,120	0.20
Concrete pavement	sy	8,142	4.00
Curb	lf	3,517	1.15
Curb & gutter	lf	43,468	1.78
Median curb & gutter,			
type I	lf	45,032	1.46
type II	lf	1,570	1.60
Valley gutter	lf	5,158	1.60
Sidewalks	sy	3,272	3.65
Driveways	sy	715	4.75
Sidewlks & drivewys, 6"	sy	162	6.00
Membrane waterproofing	sy	65	6.00
Waterproofing on walks	sy	20	1.00
Grouted rock retards	cy	703	16.88
Std RC pipe 18" φ	lf	676	5.36
24" φ	lf	6,354	5.88
30" φ	lf	8,204	7.52
36" φ	lf	10,938	8.67
42" φ	lf	252	11.05
48" φ	lf	6,458	12.90
54" φ	lf	214	16.19
60" φ	lf	648	30.00
66" φ	lf	192	20.25
84" φ	lf	120	30.00
Perf corr metal pipe, 8" φ	lf	48	3.60
Perf met culv pipe 8" φ, 16 ga,			
asph dipped	lf	40	3.00
CM culv pipe 8" φ	lf	172	3.00
12" φ	lf	90	3.00
18" φ	lf	432	4.43
24" φ	lf	9,686	5.35
30" φ	lf	4,918	6.47
36" φ	lf	3,826	9.42
42" φ	lf	1,096	11.44
48" φ	lf	1,554	12.81
54" φ	lf	372	18.33
60" φ	lf	506	19.11
72" φ	lf	174	23.30
72" φ, bev 1½:1	lf	88	32.00
84" φ, bev 1½:1	lf	158	36.49
84" φ, bev 2:1	lf	122	39.05
96" φ	lf	124	60.00
Galv MCulvP 24" φ	lf	328	5.00
30" φ	lf	206	6.25
36" φ	lf	168	10.00
42" φ	lf	94	13.25
48" φ	lf	74	15.00
60" φ	lf	132	23.50
Struct plate pipe, 120" φ bev			
1½:1, ga 510–18	lf	140	65.66
126" φ	lf	60	75.50
126" φ bev 1½:1, ga 78–17	lf	122	67.00
132" φ bev 1½:1, ga 710–18	lf	220	74.29
162" φ bev 1½:1, ga 78–17	lf	109	88.00
180" φ bev 1½:1, ga 98–17	lf	504	100.00
Remov & re-lay culv pipe			
24" φ	lf	96	3.00
36" φ	lf	104	4.00
Structural steel	lb	473,685	0.176
Struct steel & railing	lb	3,171	0.40
Remov exist members	lb	9,879	0.20
Deck timbers, treated	Mbm	5.080	500.00
Creosote treated timber	Mbm	4,528	500.00
Treated timber piles ip	lf	57	8.00
Struct steel piles ip	lf	8,420	8.44
Digging pile holes	lf	476	5.00
Fiber conduit 2" φ	lf	20,780	0.92
Galv stand pipe 4" φ	lf	200	4.00
Galv conduit 2" φ	lf	1,450	1.90
Strand type RR insul			
#22 cable	lf	1,350	0.40
#6 cable	lf	19,700	0.25
Galv 90° ells 2" φ 9½ rad	ea	6	5.00
Strand type RR insul cable #4			
600V	lf	24,244	0.40
Remov & rebld cattle grd	ea	2	500.00
French drains	lf	1,647	2.00
Remov concrete	cy	164	20.00
Damp proofing	sy	245	1.60
Asphalt plank	sy	65	10.00
Asphalt sand mastic	sy	65	2.00
Gravel backfill	cy	23	4.00
Wire rope ¾" φ	lf	60	2.00

Highway Unit Prices—Iowa

Average contract prices, Iowa State Highway Commission

Items		1941	1953	1954	1955
Road work					
Grading	cy	$0.097	$0.192	$0.149	$0.158
Conc pave, std	sy	1.952	4.197	4.044	3.928
type A	sy	1.435	2.908	3.532	3.237
Asphaltic concrete, Cl A	t	.....	7.919	7.131	7.027
Cl B	t	.....	.....	.....	4.387
Surfacing gravel	t	0.978	1.497	1.516	1.307
crush stone	t	1.543	2.889	2.794	2.675
Bridge and culvert work					
Concrete masonry	cy	17.850	47.909	41.235	43.891
Steel reinf	lb	0.041	0.121	0.102	0.107
struct	lb	0.064	0.171	0.161	0.155
Piling, untreated	lf	0.697	1.576	1.444	1.558
creosoted	lf	1.107	3.550	2.767	2.770
Excav struct, Cl 20	cy	0.799	3.047	2.370	2.644
Cl 21	cy	3.807	18.411	16.447	16.361

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FOR FAST EXCAVATING AND EARTHMOVING

Dependable Hydraulic Action . . . Economical Diesel Power!

Here's an excavating, earthmoving, and bulk material handling "team" that can't be beat—

- **The Sherman Power Digger**—Excavates to 10′ below grade. Trenching and bellhole shovels, 12″ to 39″ wide.
- **The Sherman Front End Loader**—Bucket lift, 10′10″. More reach than any comparable machine. Load capacity to 2500 pounds, ⅝ cubic yard.

Mounted on the economical Fordson Major Diesel Tractor, both are low in initial cost and upkeep. Sold and serviced by Ford Tractor dealers everywhere. Ask your dealer for an on-the-job demonstration . . . or write for free literature on both machines to Dept. No. 1413.

The Sherman Power Digger is designed, engineered and manufactured jointly by the Sherman Products, Inc., Royal Oak, Michigan and Wain-Roy Corp., Hubbardston, Mass. Patent No. 2-303-852, others pending.

★ ★ ★

The Sherman Front End Loader is manufactured exclusively for Sherman Products, Inc., by Johnson Hydraulic Equipment Co., Minneapolis, Minn.

★ ★ ★

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Maine Highway Prices

1954 Contract prices on primary and secondary roads in weighted averages, by Maine State Highway Commission Primary Highway System, FAS projects not included

Items	Unit	Quantity	Price '54 Av
Clearing	acre	113	$399.56
Removing trees, 9"–24"	ea	327	45.12
Removing trees, over 24"	ea	111	120.14
Excavation, earth	cy	553,791	0.72
Rock	cy	28,595	3.58
Unclassified	cy	274,600	1.13
Muck	cy	10,600	0.59
Exc & drainage, struct earth	cy	19,000	2.45
Rock	cy	3,070	11.91
Exc abut & ret walls			
Struct earth	cy	1,955	3.10
Rock	cy	18	12.00
Exc piers, struct earth	cy	380	6.32
Rock	cy	20	25.00
Channel	cy	1,450	1.23
Remov exist concrete	cy	24	23.75
Rail	lf	328	1.00
Common borrow	cy	210,000	0.56
Granular borrow	cy	219,000	0.65
Gravel borrow	cy	400	1.20
Gravel base crse, ipm	cy	330,790	0.78
Cr grav base crse, ipm	cy	40,000	1.47
Washed grav base crse, ipm	cy	43,000	1.65
Grav base course A ipm	cy	140,000	1.34
B ipm	cy	213,000	0.94
pit meas	cy	7,300	0.80
Bit macadam base crse	ton	14,000	6.09
Bit conc base crse	ton	22,962	7.90
Levelling course	ton	62	9.70
Stripping pits	cy	42,070	0.26
Stripping pits	cy	57,070	0.35
Sprinkling	Mg	7,350	4.69
Calcium chloride	ton	296	76.23
Gravel surface course	cy	46,710	2.91
Bit grav surf crse, premix	cy	200	10.00
Bit macadam surf crse	ton	6,150	6.85
Bit conc surf, type A	ton	24,105	9.14
Type A, crushed grav	ton	34,600	8.93
Type B	ton	21,800	8.86
Bit conc curb & sidewalk	ton	570	15.88
Road tar	gal	118,000	0.29
Asphalt cement	gal	127,100	0.185
Emulsified asphalt	gal	101,000	0.21
Cut-back asph, med curg type	gal	67,490	0.23
Tack coat	gal	20	0.30
Cor metal pipe, 12"	lf	648	2.36
15"	lf	5,540	2.59
18"	lf	2,243	2.97
24"	lf	773	4.53
36"	lf	30	10.00
Relaying	lf	755	1.36
Asph coated CMP 8"	lf	550	2.18
10"	lf	348	2.20
12"	lf	1,664	2.60
15"	lf	1,428	3.13
18"	lf	6,380	3.50
24"	lf	4,080	5.21
30"	lf	914	6.69
36"	lf	583	10.02
42"	lf	438	12.42
48"	lf	255	15.24
60"	lf	119	27.31
72"	lf	238	35.31
Reinf conc pipe 12"	lf	508	2.99
15"	lf	496	3.58
18"	lf	5,149	4.27
24"	lf	3,586	6.51
30"	lf	826	7.93
36"	lf	480	11.66
42"	lf	316	13.33
48"	lf	384	18.00
72"	lf	36	40.00
Conc sewer pipe 8"	lf	560	3.00
Vitrified clay pipe 6"	lf	259	1.25
8"	lf	128	1.90
10"	lf	206	2.01
Drop inlets, type A	ea	3	125.00
Type B	ea	9	219.44
Catch basins, type A	ea	74	232.84
Type C	ea	31	244.35
Type D	ea	13	248.46
Manholes, type A	ea	8	232.50
Type B	ea	1	240.00
Adj CB & MH to grade	ea	34	52.79
Traps, 8"	ea	36	31.50
12"	ea	6	40.00
Underdrain type B	lf	20,850	1.90
Type C 12"	lf	940	3.26
15"	lf	941	4.14
18"	lf	752	4.42
Underdrain outlets	lf	1,890	1.50
PC conc, abut & ret walls	cy	1,890	40.00
Piers	cy	566	41.91
Floor slabs	cy	159	44.09
Superstruct slabs	cy	368	53.91
Rdwy & sidewlk slabs, on steel bridges	cy	338	72.67
Superset T-beam type	cy	164	55.00
Wearing surf on bridges	cy	93	35.00
Rail	lf	399	8.07
Steps	cy	14.5	81.92
Approach slabs	cy	101	32.57
Culvert connections	ea	18	60.45
Portland cement	bbl	5,105	5.67
Expansion bearings	set	6	40.00
Steel struct, fab & del	lb	413,600	0.103
erect	lb	413,600	0.036
Wrought iron shells	lb	33,550	0.34
Struct plate pipe, 120" ϕ	lf	190	66.95
Arch 14′ x 7′, 3"	lf	89	45.00
Steel reinf, del	lb	238,718	0.10
Placing	lb	238,718	0.033
Crsed mortar masnry, 2nd cl	cy	109	88.41
Timber piles, untreated	lf	1,560	2.50
Steel H-beam piles, 42 lbs/′	lf	153	6.00
French drains	cy	310	3.31
Wrght iron rail, d&e	lf	716	12.55
Granite curb	lf	9,980	4.02
circular	lf	610	5.32
sloped	lf	33	6.50
sloped, circular	lf	23	8.00
Granite edging	lf	3,820	3.18
circular	lf	300	4.37
Field stone curb	lf	250	1.00
Plain conc sidewalk	sy	90	4.00
Guard rail, Type A	lf	70	1.35
Type C	lf	60,680	1.63
Anchors for guard rail			
Type A & B	ea	2	28.00
Type C	ea	450	33.04
Guard posts, Type A	ea	499	6.30
Fencing, wood posts	lf	890	0.54
Metal posts	lf	7,700	0.50
Barways, wood posts	ea	2	25.00
Metal posts	ea	9	40.00
Drive gateways, 12′	ea	4	25.00
Relocat woven wire fence	lf	1,286	0.46
Wooden rail fence	lf	340	0.40
Wooden gates	ea	2	20.00
Stone fill	cy	15	6.00
Lay outer face of rck fill	sy	1,300	1.50
Plain riprap	cy	65	5.00
Hand-laid riprap	cy	1,157	8.12
Loam excavation	cy	5,400	2.51
borrow	cy	2,600	2.50
Sodding	sy	15,726	1.31
Seeding, roadside mix	Msf	480	11.25
parkway mixture	Msf	98	13.48
Slope checks	lf	3,350	0.40
Hay mulch	t	38	40.00
Project markers	ea	11	23.64
Right-of-way monuments	ea	932	12.45
Underdrain outlet markers	ea	39	6.79
Traffic officers	mhr	7,180	1.45
Plank curb	lf	10,895	0.63
Metal sluice	lf	1,049	3.48
Galvanized steel pipe 2"	lf	360	1.08
Copper tubing, 1"	lf	460	1.04
Capping spring	ea	1	200.00
Remov exist conc pavement	sy	1,900	1.00

Secondary Highway System

Items	Unit	Quantity	Unit Prices—1954 Av Aver Low	 Low Bid	 High Bid
Clearing	acre	177.70	$336.80	$156.50	$500.00
Remov trees, 9"–24"	ea	296	35.69	20.00	60.00
over 24"	ea	76	81.71	40.00	200.00
Excavation earth	cy	720,400	0.68	0.50	1.25
rock	cy	43,525	3.08	1.25	10.00
unclassified	cy	7,900	2.20	2.20	2.20
muck	cy	23,580	0.56	0.50	0.80
Excav&drain,					
struct earth	cy	24,545	2.42	1.60	3.00
struct rock	cy	1,720	17.62	10.00	20.00
Exc abut & ret walls,					
struct earth	cy	2,030	4.33	4.25	10.00
struct rock	cy	170	20.00	20.00	20.00
Exc chanl, struct earth	cy	960	1.31	0.65	3.00
Remov exist conc	cy	45	45.00	45.00	45.00
rail	lf	183	7.00	7.00	7.00
Common borrow	cy	134,000	0.57	0.30	0.70
Granular borrow	cy	101,850	0.66	0.50	0.70
Gravel borrow	cy	212,000	0.77	0.70	1.50
Remov granlr borrow surf	cy	22,500	0.25	0.25	0.25
Sand base crse, ipm	cy	55,000	0.88	0.85	0.90
Grav base crse, ipm	cy	270,900	0.92	0.70	1.00
pit measure	cy	114,200	1.05	0.70	1.25
A ipm	cy	40,000	1.65	1.65	1.65
Overhaul, ipm	ymi	213,750	0.10	0.10	0.10
Stripping pits	cy	58,500	0.25	0.20	0.35
Sprinkling	unit	6,100	4.75	3.00	7.00
Calcium chloride	t	265	84.02	50.00	100.00
Grav surf crse	cy	40,530	3.05	2.00	4.00
Bit grav surf crse, MIP	cy	11,105	3.28	3.00	5.00
pre-mix	cy	60	8.00	8.00	8.00
Stone chips	t	1,430	8.31	8.00	9.00
Bit macadam surf crse	t	13,065	5.20	5.15	15.00
Bit conc surf crse, Type A	t	16,200	9.83	9.00	13.25
Type B	t	17,380	8.89	8.50	9.50
Type C	t	25,500	7.45	7.45	7.45
Road tar	gal	421,200	0.25	0.21	0.35
Asphalt cement	gal	145,000	0.16	0.16	0.16
Emuls asph, quick set	gal	1,300	0.30	0.30	0.30
Cutback asph, rap cure	gal	29,400	0.25	0.20	0.30
med cure	gal	196,300	0.22	0.20	0.24
CMP 10"	lf	106	2.10	2.10	2.10
12"	lf	5,962	2.38	2.00	2.50
15"	lf	3,380	2.73	2.50	3.00
18"	lf	1,335	3.36	3.00	3.50
21"	lf	95	3.70	3.60	3.75
24"	lf	239	4.45	4.25	4.50
30"	lf	173	5.91	5.50	6.00
ACCMP 10"	lf	250	2.25	2.25	2.25
12"	lf	2,635	2.62	2.25	2.75
15"	lf	2,362	3.19	3.00	3.50
18"	lf	12,273	3.63	3.40	4.00
21"	lf	290	4.12	4.25	4.60
24"	lf	3,073	5.31	5.00	6.00
30"	lf	1,091	7.12	6.25	7.50
36"	lf	566	11.80	10.00	12.00
42"	lf	271	11.70	11.00	12.00
48"	lf	354	14.93	13.50	17.00
ACCMP 60"	lf	155	25.00	25.00	25.00
72"	lf	447	33.43	31.26	35.00
84"	lf	80	40.00	40.00	40.00
RCP 12"	lf	120	3.00	3.00	3.00
18"	lf	92	4.00	4.00	4.00
30"	lf	8	10.00	10.00	10.00
RCPES 36"	lf	84	12.00	12.00	12.00
42"	lf	96	16.00	16.00	16.00
48"	lf	100	18.00	18.00	18.00
VCP 8"	lf	28	2.00	2.00	2.00
Drop inlets, Type B	ea	2	250.00	200.00	300.00
Catch basins, Type A	ea	55	246.45	200.00	260.00
Type C	ea	20	235.25	225.00	300.00
Type D	ea	20	236.00	220.00	280.00
Manholes, Type B	ea	2	300.00	300.00	300.00
Trap	ea	1	50.00	50.00	50.00
Catch basins, Type E	ea	5	300.00	300.00	300.00
Adj exist DI, CB, MH	ea	9	100.00	100.00	100.00
Underdrain, Type B	lf	25,375	2.07	1.75	2.50
Type C, 12"	lf	2,188	3.39	2.60	4.00
15"	lf	1,044	3.74	3.50	4.50
18"	lf	1,292	4.71	4.00	5.00
Underdrain outlets	lf	3,259	1.42	1.00	2.00
PC conc, floor slabs	cy	299.40	39.11	35.00	65.00
Abut & ret walls	cy	835	49.89	40.00	65.00
superstructr slab	cy	122	40.00	40.00	40.00
T-beam type	cy	98	60.00	60.00	60.00
culv end walls	cy	3.5	65.00	65.00	65.00
rail	lf	85	8.00	8.00	8.00
Portland cement	bbl	1,892	6.33	5.00	6.50
Struct plate pipe, 102"	lf	128	58.00	58.00	58.00
144"	lf	150	120.00	120.00	120.00
Reinf steel, del	lb	81,725	0.13	0.10	0.15
placed	lb	81,725	0.05	0.04	0.05
Steel wire mesh	lb	75	0.20	0.20	0.20
Remov exist superstr, ret by comm	ls	2	200.00	200.00	200.00
Cofferdams	ls	2	6,500	6,500	6,500
French drains	cy	25	4.00	4.00	4.00
Granite curb	lf	945	5.11	4.80	6.00
circular	lf	117	6.82	6.50	7.00
sloped	lf	766	5.85	5.50	7.00
sloped, circular	lf	175	8.00	8.00	8.00
Granite edging	lf	390	3.73	3.00	4.00
circular	lf	64	11.41	5.00	15.00
Granite curb, Type II	lf	8,948	3.22	2.55	3.75
circular	lf	675	6.11	5.00	7.50
Field stone curb	lf	4,600	1.53	0.95	3.00
Plain conc sidewalk	sy	31	6.23	3.00	7.00
Reinf conc steps	cy	19	88.95	60.00	100.00
Guard rail, Type A	lf	28,850	1.24	1.10	1.40
Type B	lf	2,150	1.35	1.35	1.35
Type C	lf	7,311	1.56	1.55	1.60
Type E	lf	369	3.50	3.50	3.50
Anchor, gd rail Tp A&B	ea	198	28.40	25.00	30.00
Type C	ea	66	31.82	30.00	32.00
End wings	ea	6	10.00	10.00	10.00
Guard posts, Type A	ea	651	6.33	5.00	7.00
Type B	ea	30	6.00	6.00	6.00
Type A, resetting	lf	350	0.50	0.50	0.50
Anchor, A gd rail, reset	ea	4	25.00	25.00	25.00
Fencing, wood posts	lf	31,875	0.44	0.40	0.60
metal posts	lf	1,000	0.45	0.45	0.45
Barways, wood posts	ea	37	27.08	15.00	50.00
metal posts	ea	2	30.00	30.00	30.00
Fence, picket....r&r	lf	300	1.00	1.00	1.00
Wire rem & relay	lf	100	1.00	1.00	1.00
Plain riprap	cy	1,220	5.16	5.00	7.00
Hand laid riprap	cy	910	8.50	7.00	10.00
Loam excavation	cy	3,450	3.13	3.00	3.50
Loam borrow	cy	7,165	2.89	2.00	3.50
Sodding	sy	46,960	1.40	1.10	1.50
Seeding, roadside mix	unit	587.5	14.06	8.50	15.00
parkway mix	unit	89	16.27	13.00	25.00
Transplant hedges	lf	600	1.00	1.00	1.00
Plant hedges, 3" min	ea	12	55.00	55.00	55.00
Slope checks	lf	14,800	0.37	0.20	1.25
Proj mrks, set only	ea	23	14.22	10.00	25.00
Settlement plates	ea	8	25.00	25.00	25.00
ROW monuments	ea	857	12.04	9.00	15.00
Underdr outlet mkrs	ea	42	6.64	4.00	20.00
Traffic officers	mh	4,990	1.51	1.25	1.65
Plank curb	lf	2,760	0.64	0.55	1.00
Metal sluice	lf	460	4.07	3.00	5.00
Granite steps....r&r	stp	14	5.00	5.00	5.00

House moving items

Items	Unit	Quantity	Aver Low	Low Bid	High Bid
Excavation	cy	675	1.00	1.00	1.00
Rock	cy	25	15.00	15.00	15.00
Borrow, gravel	cy	125	1.00	1.00	1.00
Loam	cy	525	3.00	3.00	3.00
Concrete	cy	70	70.00	70.00	70.00
Conc block masonry	blck	970	1.00	1.00	1.00
VCP 4"	lf	600	1.00	1.00	1.00
Sept tnks&75′ absrptn trench, 250 gal	ea	2	400.00	400.00	400.00
Sleeve posts	ea	4	25.00	25.00	25.00
Movng &/or raz & alt					
bldg A	ls	2	2,000	1,500	2,500
bldg B	ls	1	2,500	2,500	2,500
Seeding, park mix	unit	22	20.00	20.00	20.00
Constr 2-car garages	ea	2	1,500	1,500	1,500
18" ACCMP....r&r	lf	46	1.00	1.00	1.00
Relay 15" CMP	lf	46	1.78	1.50	2.00
24" CMP....r&r	lf	70	2.50	2.50	2.50
Moving garages	ls	1	1,500	1,500	1,500
Chain saw & operator	mh	140	5.00	5.00	5.00

• ipm in place measure • pm pit measure
• fde fabricated, delivered & erected • r&r remove & reset

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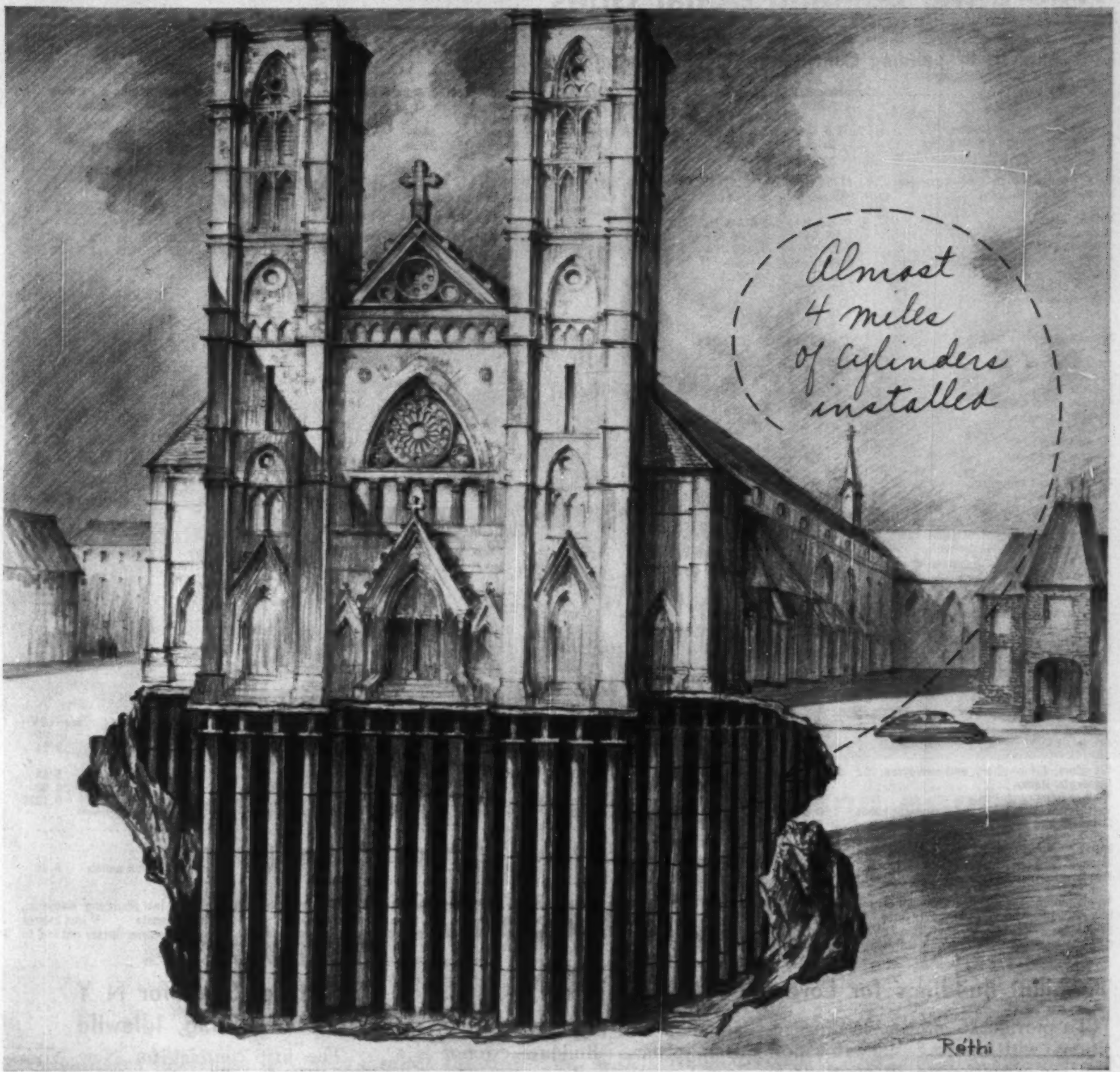

Project: St. Joseph's Cathedral, Hartford, Conn. • *Engineers:* Lockwood Greene Engineers, Inc., New York
Architect: Maginnis and Walsh, Boston, Mass.

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Where the Building Dollar Goes

Cost Analysis by Building Contractors for Engineering News-Record

Type of Building	Hospital Add'n	Novitiate	Jr-Sr High School	Mfg Plant Precision Instru	Air Passenger Terminal	High School	Elem. School	Warehouse River Terminal	Bank Building & Parking Garage—Combination		
Type of Construction: frame	S & C fr	Mas, S & C fr	Mas, S & C fr	Steel & Conc.	Steel	Steel	Steel	Steel	Porcelain Panels & Aluminum		
outside walls	Brick	Brick	Brick	Limestone	Brick	Brick	Brick	Brick	Steel	Concrete	
Date of construction, start—complete	11/54-6/56	9/55-9/56	6/53-1/55	10/51-5/53	6/52-7/53	5/54-8/55	4/55-12/55	10/54-10/55	July, 1954	July, 1954	
Location of building	Maryland	Maryland	Maryland	Long Island, New York	New Jersey	Virginia	Virginia	Tennessee			Texas
Height, stories	7 & B	2 & 3 & B	2 & 1	2	Part 1, 2, 3	1 & 2	1 & 2	1 Story	8-2 pent.	2	
Floor area, sq ft	94,444	98,838	163,226	393,631	185,373	104,252	39,004	28,800	93,650	56,972	150,622
Volume, cu ft	13,518	1,123,776	2,993,636	6,975,493	5,080,640	1,233,258	515,392	777,600	1,164,912	683,664	1,848,576
% of floors (volume) air conditioned	Op rms only	None	None	70	15	0	0	None	90	......	60
Unit cost: per sq ft	$16.37	$12.29	$13.57	......	......	$11.432	$12.68	$41.33	......	......	$13.49
per cu ft	$ 1.09	$ 1.08	$ 0.74	......	......	$ 0.9664	$ 0.959	$ 1.53	......	......	$ 1.10
per classroom	......	......	......	......	......	$30,560[k]	$29,087[l]	......	......	......	......
Principal Items of Cost	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total	% of Total
Excavation and site improvements	2.1	1.4	7.9	4.28	1.74	3.41	7.08	6.45	......	......	1.27
Foundations	2.0	2.2	2.7	9.36	....	1.00	0.81	46.63	......	......	6.57
Structural frame	16.7	10.5	10.5	16.95	26.38	14.07	13.75	4.31	......	......	15.21
Cement finish work	0.9	0.9	1.0	0.63	....	....	0.27	0.45	......	......	1.25
Exterior masonry	7.6	13.2	13.0	6.78	11.42	14.26	10.11	4.16	......	......	2.16
Metal siding	....	....	....	....	0.44[h]	None	None	....	......	......	8.40
Interior partitions	3.9	2.8	5.5	1.51	With ext. mas.	8.52	6.57	0.007	......	......	0.52
Carpentry and millwork	2.8	3.4	3.5	0.11	1.95	4.87	5.66	0.30	......	......	0.63
Sash and glazing	3.5 A	2.6	3.3	1.11	1.79	1.68	4.10	0.001	......	......	2.44
Doors	0.5	1.2	see Holo Met	0.38	0.34	Millwork	Millwork	1.13	......	......	0.78
Roofing, sheet metal, insulation	0.7	2.3	1.7	2.81[c]	2.37[a]	2.72	1.52	1.54	......	......	0.56[a]
Waterproofing and dampproofing	0.6	0.8	0.7	0.25	0.25	2.18	0.72	....	......	......	0.78
Metal lath, furring, and plastering	3.3	5.2	0.6	3.72	2.54	4.87	1.74	....	......	......	3.91
Hollow metal work	0.9	1.2	0.8	0.28	0.43	....	0.79	....	......	......	0.26
Miscellaneous iron and ornamental metal	1.2	1.6	4.3	1.11	7.25	1.68	4.04	0.045	......	......	0.25
Tile, terrazzo, and marble	2.9	2.4	2.0	1.67	2.08	8.80	1.51	....	......	......	1.20
Floor covering	0.8	1.7	0.5	2.17	0.14	0.88	1.85	0.002	......	......	1.10
Painting	1.6	1.5	1.7	0.30	1.11	1.67	1.76	1.68	......	......	0.59
Finish hardware	2.5	0.5	1.2	0.12	0.22	0.65	1.04	....	......	......	0.59
Acoustical ceilings	0.9	0.2	1.4	1.94	1.59	1.17	2.41	....	......	......	0.73
Vault doors	....	0.05	....	....	....	None	0.13	....	......	......	....
Kitchen equipment	4.5	0.8	1.0	3.38	2.64	sep contr	sep contr	....	......	......	....
Plumbing	see H&V	see H&V	see H&V	7.07[m]	see H&V	4.19	9.08	1.10	......	......	see H&V
Heating, ventilating, and air conditioning	25.1[b]	15.45[e]	20.3[e]	21.18	16.17[e]	12.58	14.84	1.30	......	......	19.95[e]
Electrical work and light fixtures	see H&V	3.7	8.2	11.29	17.28	6.29	4.15	1.69	......	......	9.24
Elevators, dumbwaiters, and conveyors	4.2	1.0	....	1.04	0.31	....	....	....	......	......	5.83
Incidental items	7.7	18.7	6.0	0.31	0.62	4.17	5.67	0.005	......	......	10.20
Mail or laundry chutes	0.1 L	0.3 L	....	....	....	....	....	....	......	......	0.12M
Vertical mail conveyors and pneumatic tubes	0.5 pt	....	....	0.25	....	....	....	....	......	......	....
Counters and display cases, spec cabinets	2.5[d]	....	1.7	....	....	0.06	....	....	......	......	....
Intercommunication systems and television	....	1.7	....	....	....	0.28	0.40	....	......	......	....
Unusual features	....	1.8[f]	0.5[g]	....	0.94[i]	....	....	29.20[j]	Porcelain facing panels		5.46
Refrigeration	....	0.9	....	....	....	....	....	....	......	......	....

•A aluminum •S steel •C concrete •Mas masonry •H&V heating & ventilating •pt pneumatic tubes •[a] insulation $0.07 •[b] incl plumbing, electrical, laundry equipment, oxygen supply lines •[c] incl deck •[d] special metal cabinets •[e] incl plumbing •[f] pews & vestment cases •[g] auditorium seats •[h] incl interor partitions •[i] display signs •[j] railroad trestle •[k] gym, cafeteria, auditorium, library not incl in classroom count for figuring unit cost •[l] cafeteria, library not incl in classroom count for figuring unit cost •[m] and sprinklers

Terminal Buildings for Love Field Airport, Texas

To provide 26 airplane loading positions with moving sidewalks now and for expansion to 30 positions in the future, Dallas has a new $6.5 million terminal building development underway at Love Field Airport. Associated architects and engineers are Broad & Nelson and Jack Corgan of Dallas. Mechanical and electrical engineers are Zumwalt & Vinther, also of Dallas.

Work must be complete in 22 months with liquidated damages of $50 a day thereafter. It includes a 2-story main building 284 ft x 241 ft x 40 ft with 1-story wings, a 4-story office section with the airport control tower four stories above the office section. A mail and air cargo building 80 ft x 450 ft and a mechanical service building 63 ft x 123 ft are part of the project which is laid out for minimum interference of passenger traffic within the terminal. Moving sidewalks help passengers to and from planes. Building exterior is a metal curtain wall.

Wages range from $1.45 for common labor to $2.75 for carpenters, $3.4375 for plasterers and $3.50 for bricklayers.

The structures account for 473,740 sq ft, distributed like this:

Main Building	sq ft	284,570
Mail and Air Cargo Building		42,890
Mechanical Service Building		15,350
Bridges, Loading Piers, & Misc		130,930

Prime Contractors, with lump sum contracts, are:

	Contract	% of Total
General: T. C. Bateson Constr. Co	$4,243,899	65.13
Mechanical: Kieffer Plumbing & Heating Co	1,310,781	20.12
Electrical: Fischbach & Moore of Texas	530,618	8.14
Outside Utilities: E. H. Reeder Constr Co	93,026	1.43
Elevators: Hunter Hayes Elevator Co.	50,950	0.78
Escalators: Otis Elevator Co	52,414	0.80
Moving Sidewalks: Hewitt-Robins Co, Passaic, N. J.	234,703	3.60
Total	$6,516,391	100.00

All contractors are from Dallas except as noted.

Structural Steel for N Y Arrival Building, Idlewild

The first contract for New York City's $15 million International Arrival Building and Airline Wing Buildings is for furnishing and erecting 6,700 tons of steel that will enclose more than half a million square feet of floor area. This is part of the New York Port Authority's $60-million terminal development at International (Idlewild) Airport, ENR Mar. 10, p. 46. Skidmore, Owings and Merrill, New York, are architects. John J. Fitzgerald, Jr., is deputy chief engineer for the Port Authority.

Bidders include:

1C	Harris Structural Steel Co., Inc., New York	$1,920,700
2	American Bridge Div., U. S. Steel Corp., N. Y.	1,976,220
4	Bethlehem Steel Co., New York	2,044,200

Bids: 8-30-55 Items	Unit	Quantity	Unit Prices 1C	2
Steel, struct, except open web joists, furnish	lb	12,000,000	$0.1125	$0.1178
erect			0.03	0.029
Open web joists, furnish	lb	1,400,000	0.12	0.1243
erect			0.0305	0.029

Brady Group of Dormitories,
Michigan State University, East Lansing.
Architect: Ralph R. Calder, Detroit.

General Contractor: Christman Co., Lansing.
Concrete Work: The Hausman Steel Company, Toledo.

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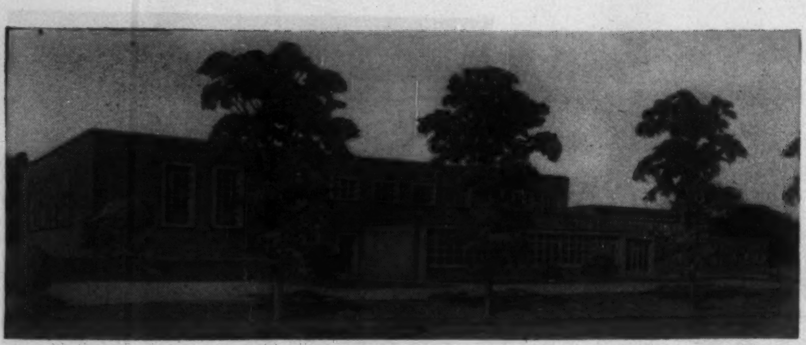


2 Gyms and Swimming Pool for Massachusetts College

The $1-million gymnasium-swimming pool building for State Teachers College at Bridgewater, Mass., went under contract to Poorvu Construction Company for $100,000 less than the architect's estimate. Nine bidders competed for this job which includes a 289-ft x 140-ft building with 9 outside corners, 44-ft height, two gymnasiums, a swimming pool, offices, three classrooms, lockers and showers. The swimming pool has six lanes, is 42-ft x 75-ft, 12-ft to 3-ft-6-in deep. Harry Gulesian, Boston, is the architect.

Cost excluding walks and grading is $1,021,665 which is $0.83 per cu ft and $16.79 per sq ft, based on a cube of 1,231,100 and floor area of 60,857 sq ft. This price includes furnishings and the total contract price includes grading for the athletic field.

Considerable sub-surface water on the lot will complicate construction work. Concrete is required to test at 3,000 and 2,500 psi.

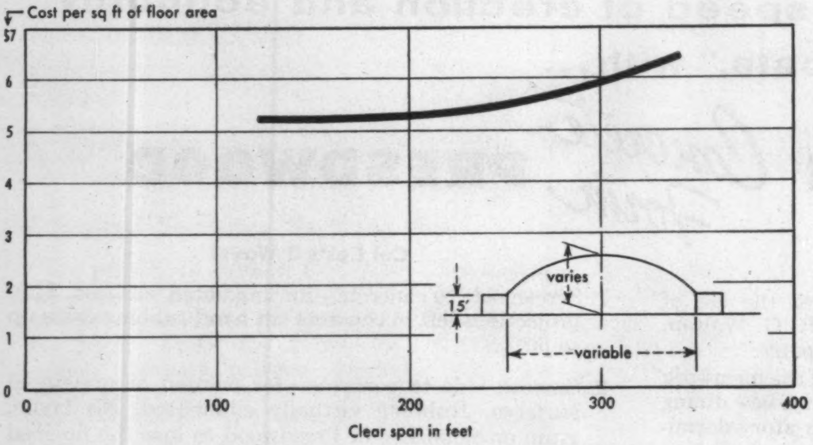
An analysis of the bidding includes:

1C	Poorvu Construction Co	$1,028,444
2	G. L. Rugo & Sons	1,044,000
9	Bossi Constructors, Inc	1,095,659
AE	Harry Gulesian, Boston, Mass	1,120,000

Items	Total	% of Total	$/cf	$/sf
Structure	$685,709	67.2	0.557	11.27
Plumbing	66,887	6.5	0.054	1.10
Heating & ventilating	172,986	16.9	0.141	2.84
Electrical	56,344	5.5	0.046	0.93
Equipment	39,739	3.9	0.032	0.65
Total	$1,021,665*	100.0	0.830*	16.79*

Completion time: 365 calendar days

* excl. walks and grading



Costs of Concrete Barrel Arches

Using mostly actual costs of thin-shell, reinforced concrete arched roofs for hangars, Ammann & Whitney, consulting engineers, New York City, prepared the above chart. It shows how the cost of arched-roof buildings per square foot of floor area varies with arch span.

Costs for spans over 250 ft were estimated.

The design is based on concrete shells about 3½ in. thick and ribs spaced 30 ft c-c, with the springing line 15 ft above the floor. Leantos were assumed to be 16 ft wide.

Costs include those for shell, ribs, abutments, foundations, excavation, grading gravel backfill, insulation and roofing for the barrel arch; leanto roofs, roofing and insulation; rib flashing and concrete floor. Six uses of falsework for two spans were assumed. Total length of building was taken as 350 ft.

Low Maintenance and Repair Costs on Defense Housing

The low construction cost of $2,172 per dwelling unit for Benning Park Homes, Columbus, Ga., ENR July 16, 1942 p. 82 has been followed by low maintenance and repair costs that have kept this development on a self-liquidating basis, even a profitable one. This was permanent defense housing built to the standards of the Federal public housing program.

The 350 dwelling units are in 110 multiple dwelling buildings, 10 buildings with six units each, 45 buildings with four units each, and 55 buildings with two units each plus a management and maintenance building and a truck shed. The 50-acre site was improved with bituminous macadam pavements, concrete sidewalks, underground street lighting system, overhead electrical distribution, sewers and water supply facilities, automatic fire alarm system including complete central station equipment.

Construction included reinforced concrete foundations, concrete block foundation walls, 4-in. slab reinforced concrete first floor, wood joists for second floor, wood rafters and asphalt composition shingles for roof, oversized brick masonry in exterior walls, wood stud and plaster for interior partitions and steel sash for windows. The projects was reroofed in 1954.

Built under the Lanham Act, Benning Park Homes was managed for the Federal Works Agency by the Housing Authority of City of Columbus, Ga. until 1947 when $447,262 had been collected in income and $348,613 had been paid out for operating expense, including $76,209 for repairs, maintenance and replacement.

Since the transfer to the War Department operating income and expense are estimated to be $756,000 and $600,000 respectively, a return of $165,000 in six years.

Maintenance and Repair Costs, Benning Park Homes, Georgia

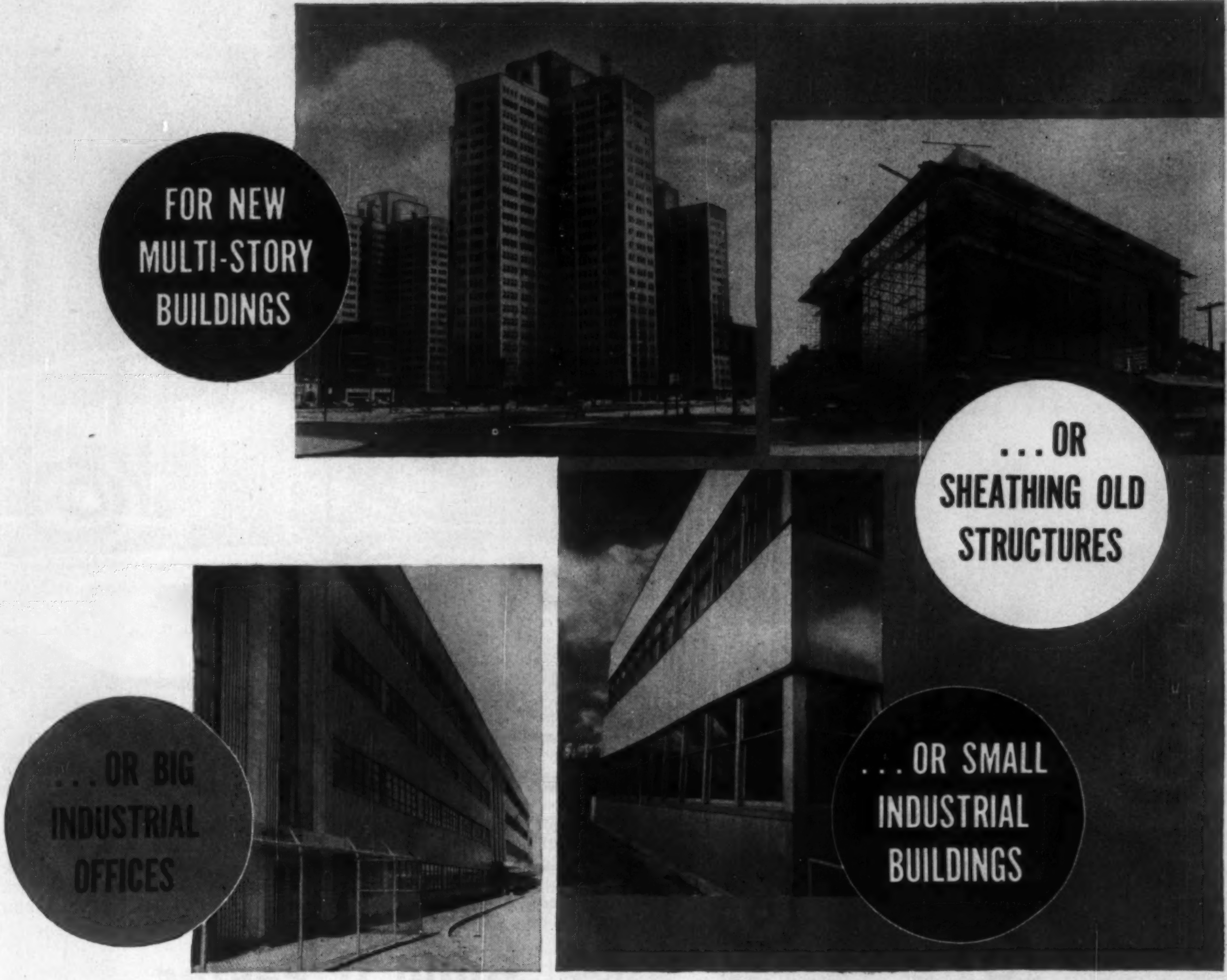
On Permanent Defense Housing Built 1941-'42 for $760,000

Year	Total	Year	Total	Year	Total
'42–'43	$7,448	'46–'47	$18,908	'50	$86,466
'43–'44	13,065	'47–6 mo.	2,929	'51	31,960
'44–'45	14,258	'48	20,401	'52	60,244
'45–'46	19,601	'49	53,445	'53	69,657

By Type	'48	'49	'50	'51	'52	'53
Water Systems	$48	—	$88	$7	—	$1,223
Sewage Systems	974	$157	25	—	—	1,977
Electric Systems	236	237	279	1,072	$1,315	528
Gas Distri.	—	—	—	—	16	319
Refrigeration	264	355	158	319	415	697
Buildings	15,158	45,915	34,251	24,076	53,607	57,252
Spec. Equip. & Misc. Struct.	54	5,265	4,980	5,089	4,130	6,140
Grounds	3,054	1,107	2,802	1,119	761	1,169
Surfaced Areas	613	409	23,883	278	—	352

1942–'47 Operated for Federal Works Agency by Housing Authority of City of Columbus, Ga.

1948—date Operated by War Department for military personnel at Fort Benning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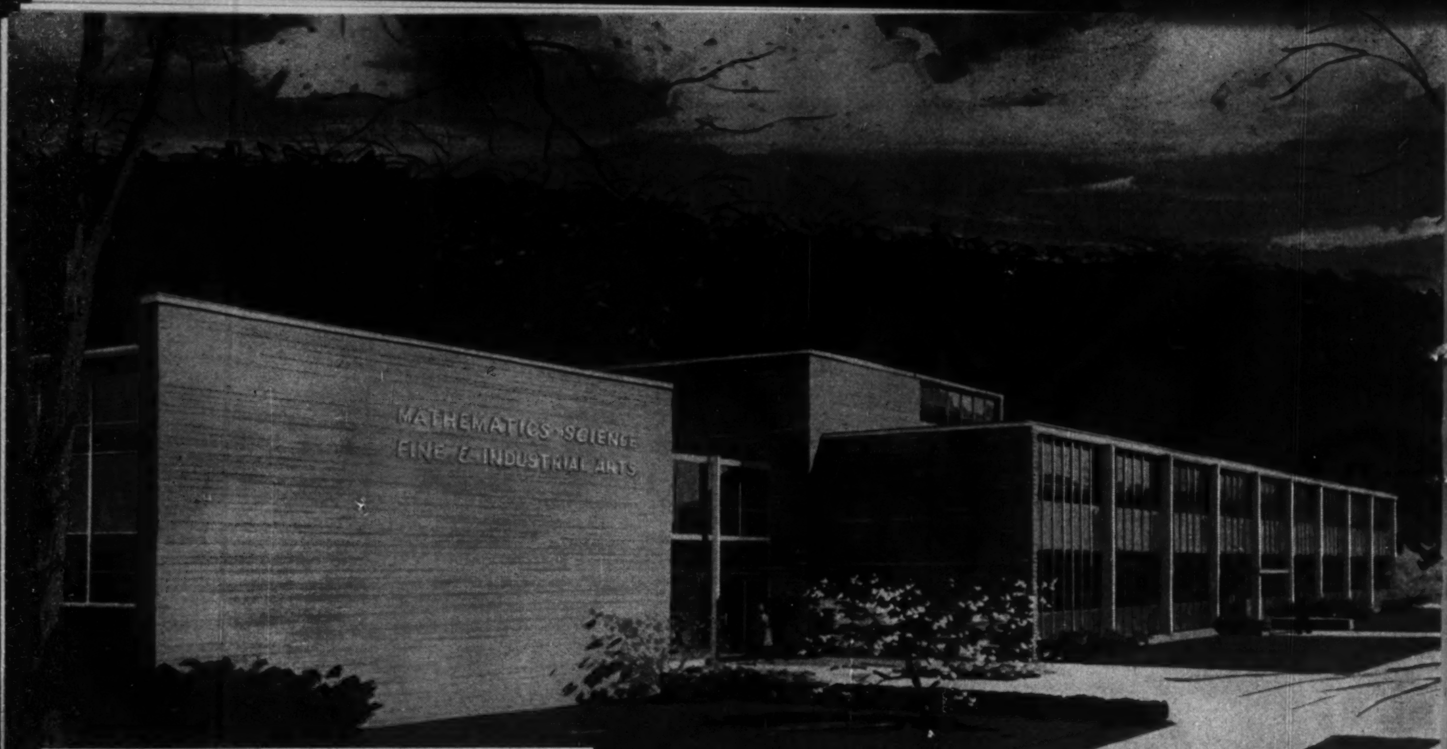
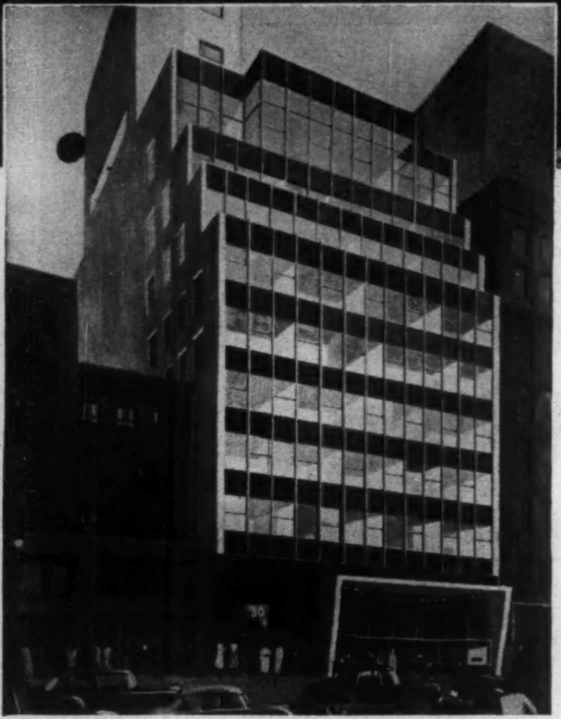


NEW JERSEY STATE TEACHERS' COLLEGE, MONTCLAIR, N. J. (2 bldgs.) Architect: Emil Schmidlin. Contractor: Martin Infante Co., Inc., Lodi, N. J. Lupton Curtain-Wall System, Type H. Width modules 3'9" & 4'1". Fixed glass and projected-in ventilators. Opaque areas are 1/8" thick embossed, fluted aluminum, Alumilited. Special features: Heavy aluminum sub-frames and door frames.



FIFTH AVENUE DIAMOND CLUB, NEW YORK CITY. Architects: Sylvan Bien & Robert L. Bien. Contractors: Kayfield Construction Corp. Lupton Curtain-Wall System Type H. Width Modules: 3'7" and 3'4". Ventilators: Project out for window cleaning only. 1/4 Plate Glass. Facing Material: 1/8" aluminum plate, Alumilited, 6" back up wall with air conditioning unit.

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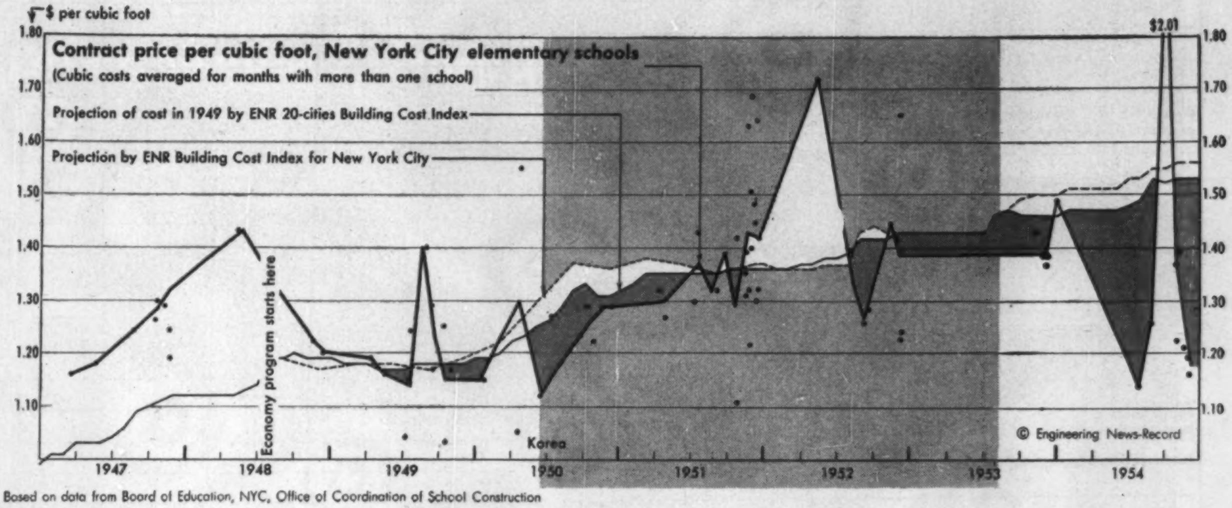


Based on data from Board of Education, NYC, Office of Coordination of School Construction

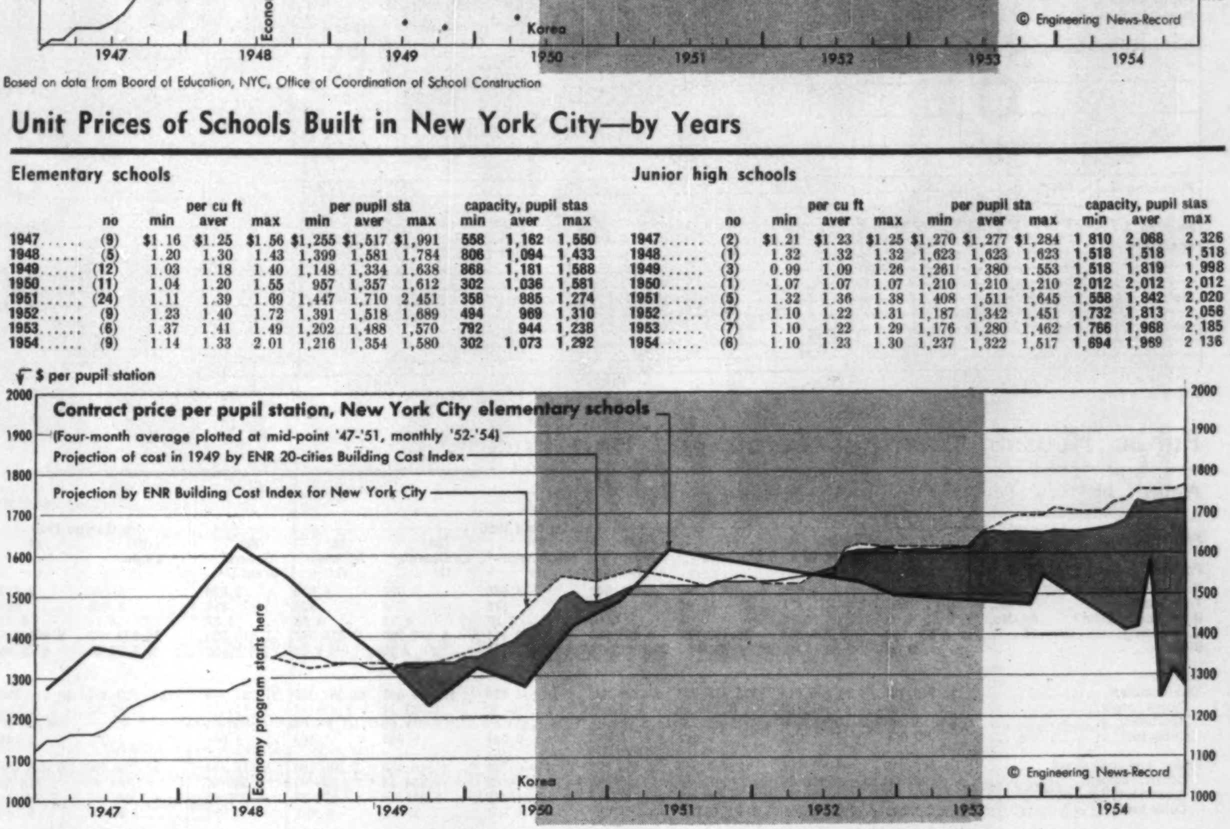
Unit Prices of Schools Built in New York City—by Years

Elementary schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no	min	aver	max	min	aver	max	min	aver	max
1947......	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,162	1,550
1948......	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949......	(12)	1.03	1.18	1.40	1,148	1,334	1,638	868	1,181	1,588
1950......	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,036	1,581
1951......	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952......	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310
1953......	(6)	1.37	1.41	1.49	1,202	1,488	1,570	792	944	1,238
1954......	(9)	1.14	1.33	2.01	1,216	1,354	1,580	302	1,073	1,292

Junior high schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no	min	aver	max	min	aver	max	min	aver	max
1947......	(2)	$1.21	$1.23	$1.25	$1,270	$1,277	$1,284	1,810	2,068	2,326
1948......	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949......	(3)	0.99	1.09	1.26	1,261	1 380	1.553	1,518	1,819	1,998
1950......	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951......	(5)	1.32	1.36	1.38	1 408	1,511	1,645	1,558	1,842	2,020
1952......	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056
1953......	(7)	1.10	1.22	1.29	1,176	1,280	1,462	1,766	1,968	2,185
1954......	(6)	1.10	1.23	1.30	1,237	1,322	1,517	1,694	1,969	2 136

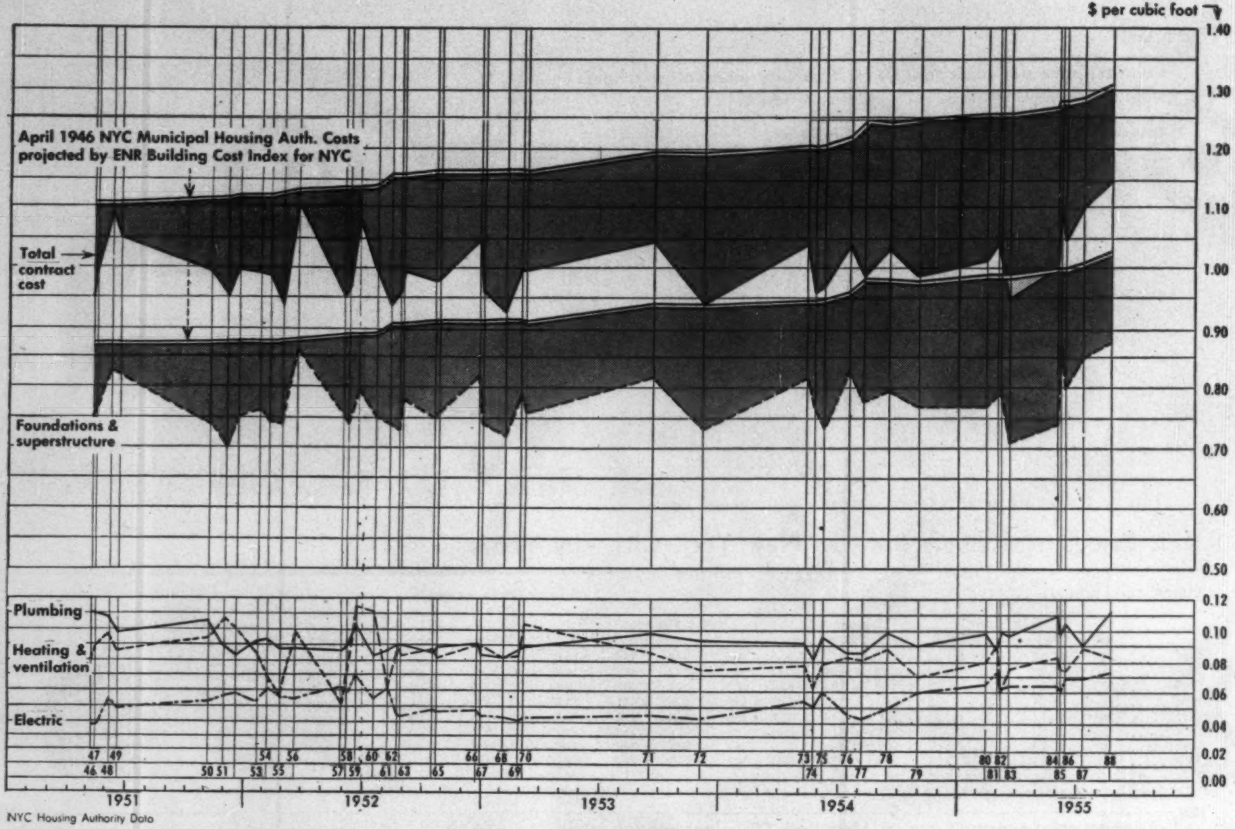


School Building Unit Contract Prices, New York City—1954

Bureau of Construction, Board of Education, City of New York

No.	Size, min-aver-max pupil station	Auditorium gymnasium	Min-aver-max COST per $/pupil station	Min-aver-max COST per $/cubic foot	Min-aver-max % of total bldg contract price* gen'l constr %	heating %	plumbing %	electrical %
Elementary schools, new 3-story								
6	1058–1148–1292	aud, gym, lnch-plyrm.....	$1,216–1,340–1,421	$1.14–1.27–1.39	71.8–74 5–76.7	10.6–11.1–12.9	4.9–5.4–5.9	7.3–9.0–10.5
Elementary schools, new basement 6 2-story								
2	1228–1237–1245	aud, gym, lnch-plyrm.....	$1,253–1,282–1,310	$1.16–1.175–1.19	70.2–70.6–70.9	12.5–12.7–12.9	5.6–5.7–5.7	11.0–11.1–11.2
Elementary school, new 1-story								
1	302	multi-purpose rm.........	$1,580	$2.01	73.2	12.3	7.6	6.9
Elementary school, additions								
1	252	3rd st; clrms only........	$661	$1.58	82.2	11.1	2.6	4.1
1	460	8 reg clrms; 5 spec.......	....	$1.68	73.5	10.0	6.5	10.0
Junior high schools, new 3-story								
4	1920–2037–2136	aud, gym, cafet...........	$1,237–1,274–1,350	$1.10–1.23–1.30	70.6–72.3–73.4	10.6–11.1–11.9	4.3–4.7–5.1	11.1–11.9–12.7
1	1694	K-9, aud, gym, cafet......	1,517	$1.23	73.0	11.2	4.2	11.6
Junior high school, new 4-story								
1	1972	aud, gym, cafet..........	$1,321	$1.24	73.2	10.9	4.9	11.0
Elementary school converted to junior high								
1	946	23 clrms incl 13 spec...... 6 shop rms; gym, cafet	....	$1.44	73.3	11.4	6.2	9.1
Vocational high school, new 2 & 3-story								
1	2330	aud, gym, cafet..........	$1,955	$1.43	68.9**	10.5	4.6	16.0

* excludes abnormal site costs and equipment   ** Incl cost of elevators



NYC Housing Authority Data

Public Housing Contract Totals and Unit Prices

Awards by New York City Housing Authority

	4th Q '54	1st Half 1955							3rd Quarter 1955	
Project Number	(79)	(80)	(81)	(82)	(83)	(84)	(85)	(86)	(87)	(88)
Project	Forest II[e]	Wagner I[d]	Marlboro[e]	Albany II[e]	Washington II[d]	La Guardia II[d]	Jefferson II[d]	General Grant II[d]	Linden*	Carver II[e]
Total constr. rooms.........No.	2,796	4,875	7,199	1,640	3,688	3,026	1,410	3,424	6,534	2,813
Total apartments...........No.	693	1,177	1,765	400	878	724	324	813	1,590	682
Rooms per apartm't.....Av. No.	4.03	4.14	4.08	4.10	4.20	4.18	4.35	4.21	4.11	4.12
Total cubage............Cu. ft.	5,976,800	9,230,654	15,183,887	3,249,689	6,988,161	5,852,789	2,934,540	7,912,226	14,333,039	5,493,215
Bid date	10/26/54	2/15/55	3/1/55	3/8/55	3/22/55	6/1/55	6/8/55[a]	6/15/55	7/12/55	8/23/55
Cost per:										
Total contract	$5,915,737	$9,339,614	$15,813,926	$3,299,372	$6,614,429	$5,849,667	$3,241,317	$7,367,514	$15,733,397	$6,315,320
Constr. room	2,113.00	1,915,82	2,196.68	2,011,81	1,793.50	1,933.14	2,298.81	2,151.73	2,407.92	2,245.05
Apartment	8,536.00	7,935.00	8,959.73	8,248.43	7,533.52	8,079.65	10,004.06	9,062.31	9,895.22	9,260.00
Cubic foot	0.989	1.012	1.042	1.015	0.946	0.999	1.104	1.051	1.098	1.149
Fndns. and superstruct	4,592,410	7,061,905	12,060,949	2,569,272	4,956,729	4,340,430	2,550,700	5,615,584	12,175,700	4,833,680
Constr. rooms	1,642.00	1,448.60	1,675.36	1,566.62	1,344.02	1,434.38	1,809.01	1,540.07	1,863.44	1,718.34
Apartment	6,627.00	5,999.92	6,833.40	6,423.17	5,645.48	5,995.06	7,872.53	6,907.24	7,657.67	7,087.51
Cubic foot	0.768	0.765	0.794	0.791	0.709	0.742	0.869	0.801	0.850	0.880
Heating and ventilation	439,190[c]	775,895[c]	1,323,977	207,500	528,900[c]	487,150[c]	224,204[c]	523,264[c]	1,273,700[b]	453,000[e]
Constr. rooms	157.00	159.15	183.91	126.52	143.41	160.99	159.01	152.82	194.93	161.04
Apartment	634.00	659.21	750.13	518.75	602.39	672.86	691.99	643.62	801.07	664.22
Cubic foot	0.073	0.084	0.087	0.064	0.076	0.083	0.076	0.075	0.089	0.083
Electrical constr.	347,837	596,590	1,088,000	202,350	450,800	375,890	178,800	486,612	986,000	408,740
Constr. rooms	124.00	122.37	151.13	123.38	122.23	124.22	126.81	142.12	150.90	145.30
Apartment	502.00	506.88	616.43	505.88	513.44	519.19	551.85	598.54	620.13	599.33
Cubic foot	0.058	0.065	0.073	0.062	0.064	0.064	0.061	0.069	0.069	0.074
Plumbing	536,300	905,224	1,341,000	320,250	678,000	646,197	287,613	742,054	1,297,997	619,900
Constr. rooms	192.00	185.69	186.28	195.27	183.84	213.55	203.98	216.72	198.65	220.37
Apartment	774.00	769.09	759.77	800.63	772.21	892.54	887.69	912.73	816.35	908.94
Cubic foot	0.090	0.098	0.088	0.099	0.097	0.110	0.098	0.106	0.091	0.113
Piling or abnorm. fndns.	160,000	550,000	2,308,000	78,000	1,100,000	295,710	20,196	510,862	793,000	850,000

* special standards Part 4, city aided program; without cash subsidy [a] bid date for contracts 7, 8, 9 & 10, 6/8/'55; date for contracts 5 & 6, 7/19/55 [b] incl total cost of boiler plant [c] incl proportionate cost of boiler plant cost [d] federally aided project [e] state aided project

Prices bid on housing projects let by the New York City Municipal Housing Authority increased sharply in June '55 and the rise continued during the third quarter. Top price paid by the Authority was $1.149 per cu ft on the contract for Carver II houses bid on August 23. This was 21% above the 1955 low of $0.946 per cu ft bid June 1 on the Washington II job and 10% above the top price paid in 1954.

Most of the 1955 rise came in foundations and superstructures which hit a high of $0.88 per cu ft on the August 23rd job. This was 24% above the low for the year of $0.79 per cut ft and compares with a top of $0.827 in 1954. The cost of mechanicals also trended up in '55. Electrical work ranged between $0.061 to $0.74 per cu ft compared with $0.043 to $0.060 in '54. Plumbing costs ran from $0.088 to $0.113 cu ft in '55 compared with $0.082 to $0.99 in '54. Heating and ventilation costs changed little at this range: $0.064 to $0.089.

On schedule . . . through the winter . . .

Christopher Columbus Houses, Newark, N. J., as of March, 1955.

Owner: HOUSING AUTHORITY, City of Newark, N.J.
Architect: WM. E. LEHMAN, Newark, N. J.
Contractor: TERMINAL CONSTRUCTION CORP., Wood Ridge, N. J.
Ready Mix Concrete: J. P. CALLAGHAN CO., Harrison, N. J.

. . . WITH LEHIGH EARLY STRENGTH CEMENT

Careful planning, good management and Lehigh Early Strength Cement kept construction on Newark's First Ward Housing Project moving at a steady pace through the winter of 1954-1955.

The quick curing concrete, made with Lehigh Early Strength Cement, enabled Terminal Construction Corporation to strip column forms in 24 hours, beam and arch forms in 48 hours. Curing time was cut by two-thirds. *And within 2½ working days after a pour, all forms were in place on the floor above, ready for the mechanical trades.*

Each day's pour—approximately 200 cubic yards—was completed before noon. With less bleeding and earlier hardening of the Early Strength concrete, finishers were off the job by 3:30 P.M. Overtime costs and unproductive overhead were cut to a minimum.

Remember Lehigh Early Strength Cement when planning winter concrete work. It will help you speed construction, cut costs.

LEHIGH
HIGH EARLY STRENGTH
PORTLAND CEMENT

LEHIGH EARLY STRENGTH CEMENT
LEHIGH PORTLAND CEMENT
LEHIGH AIR-ENTRAINING CEMENTS
LEHIGH MORTAR CEMENT

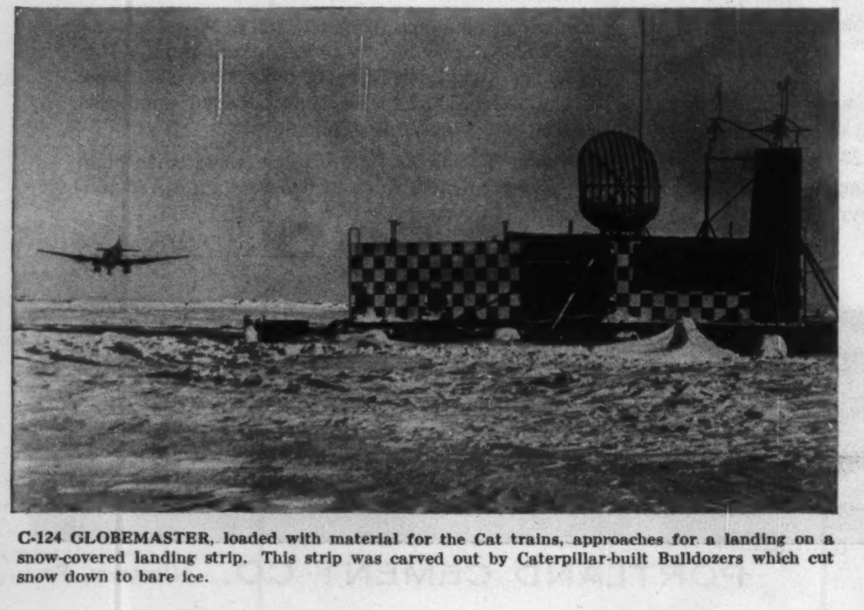
LEHIGH

PORTLAND CEMENT CO. *Allentown, Pa.*

REPORT ON BUILDING THE DEW LINE

On the rim of the world, construction men... using airlifts, Cat-powered tractor trains, and ingenuity... are buying the nation precious time against a sneak H-bomb attack

CAT TRAINS complete transportation of material from the United States to construction bases on the DEW line. D8s tow loaded sleds across ice to the final installation sites.



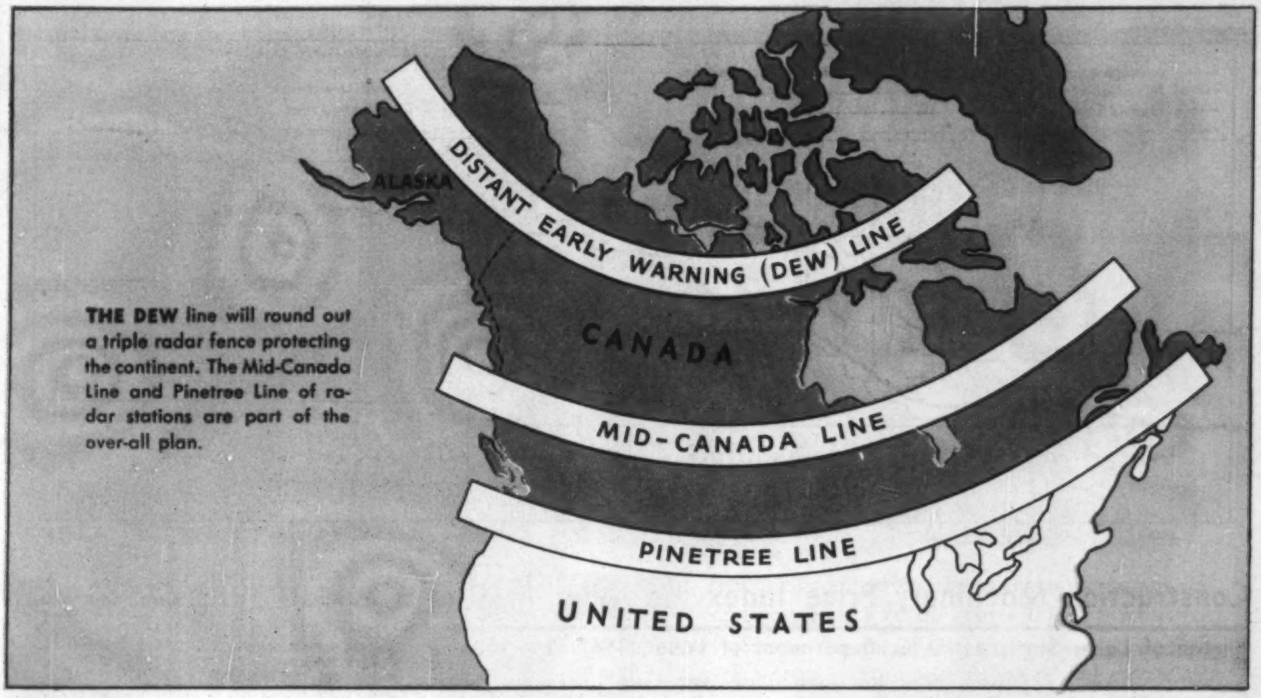
C-124 GLOBEMASTER, loaded with material for the Cat trains, approaches for a landing on a snow-covered landing strip. This strip was carved out by Caterpillar-built Bulldozers which cut snow down to bare ice.

Eighteen hundred miles north of Chicago, temperatures plunge to 70 below, blowing snow cuts visibility to zero, and sparse vegetation shatters like glass. Here construction men and machines are battling to carve out the world's greatest Arctic defense project—the Distant Early Warning (DEW) line, a joint U. S.-Canadian venture.

When finished they will have wrung from the Arctic wastes vital extra warning time against a sneak aerial attack. An uninterrupted line of radar stations will maintain a never-ending vigil.

Men and material began moving swiftly and silently inside the Arctic Circle early this year. Ice roads and complete camps were built where none existed a few weeks before. Men and machines had moved in by airlift and CAT*-powered tractor trains.

That was the end result of two years' research and study spearheaded by Western Electric, Bell Telephone System's manufacturing and supply unit. In February, Western Electric



THE DEW line will round out a triple radar fence protecting the continent. The Mid-Canada Line and Pinetree Line of radar stations are part of the over-all plan.

was named prime contractor for the DEW line construction. Subcontractors include Puget Sound Bridge and Dredging Company and Johnson, Drake and Piper, Inc., both of Seattle; the Northern Construction Company and J. W. Stewart, Ltd., of Vancouver; and Foundation Company of Canada, Ltd., of Montreal.

Backbone of each of the spreads is Caterpillar* Arctic-proof equipment. It has proved itself building Thule Air Base in Greenland. It has hauled supplies for the Naval Petroleum Exploration Program at Point Barrow. For decades it has served the commercial needs of industry of the north in mining, construction, pulp and similar operations.

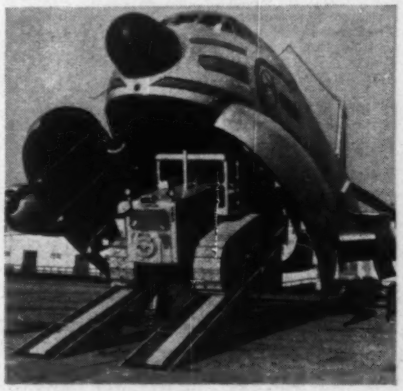
To get the job done it was natural for DEW line subcontractors to rely on their fleets of D4s, D6s, D8s, No. 12 Motor Graders, Traxcavators*, Cat Scrapers and Electric Sets.

Cat trains moved above the Arctic Circle making landing strips and blazing new snow roads through the meager stands of hoar-frosted vegetation which reacted like glass when snapped by bulldozers. Other Cat units followed, flown into the landing strips in the Air Force's big airlift, "Operation Big Haul."

Altogether 6600 tons of tractors, buildings and other heavy equipment were brought in by the Tactical Air Command's 18th Air Force. At the airstrips, construction crews put together hundreds of small prefabricated buildings and bolted them to rounded timbers which served as sled runners. Trains of them were towed by Caterpillar track-type Tractors to various Arctic sites.

All big yellow machines have been winterized to withstand temperatures as low as 70 below. The foresight has paid off. On February 15, nine D8s, all equipped with Caterpillar's new oil clutches, were at a point where the mercury dropped to an all-time low of 76 below! *No trouble was reported!*

A few refinements have been added, such as escape hatches for operators of tractors in the event they drop through the ice.

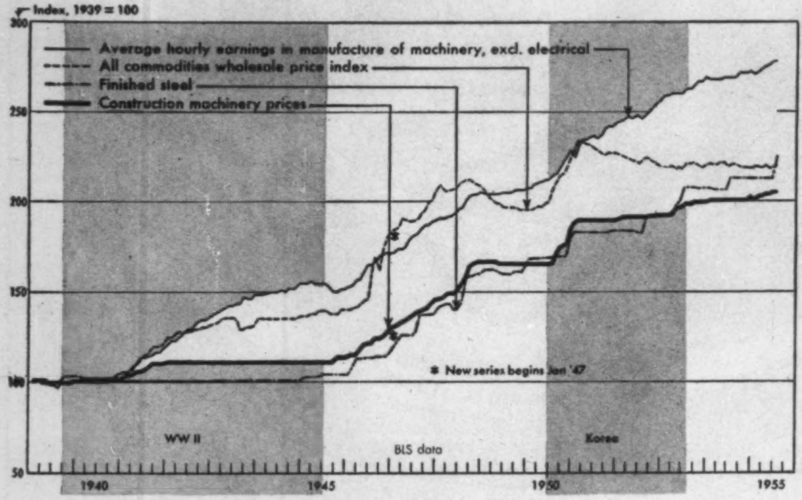


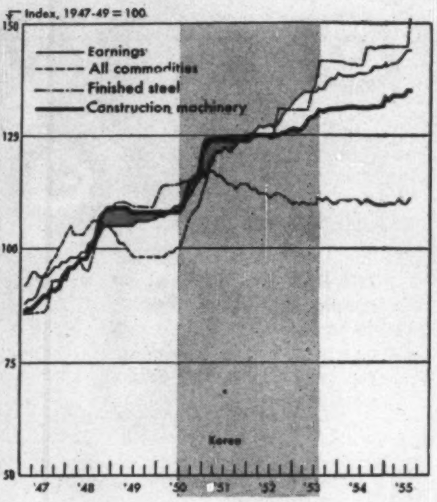
A D8 is pulled aboard a Globemaster as part of the DEW line airlift at an Alaskan base. Tractors made up a good part of the 6600 tons of cargo which the Air Force flew to advance bases.

Today, north of the Arctic Circle, the painstaking research which goes into all Caterpillar equipment is paying off. For on this vital project . . . on this toughest of all proving grounds . . . only the most dependable equipment can be trusted. Once again the choice has been Caterpillar.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS, U. S. A.

*Cat, Caterpillar and Traxcavator are registered trademarks—®





Construction Machinery Price Index

Bureau of Labor Statistics, U. S. Department of Labor, 1947-49 = 100

By type of equipment	1947 Jan.	1948 Jan.	1949 Jan.	1950 Jan.	1951 Jan.	1952 Jan.	1953 Jan.	1954 Jan.	1955 Jan.	1955 July
Constr machy & equip, all types	86.3	95.8	108.7	108.0	123.1	124.6	126.2	131.2	133.2	134.7
Power cranes, etc	87.7	95.4	108.3	106.9	123.3	123.6	124.2	129.9	133.8	135.7
Machinery, tractor mounted	83.2	93.8	108.9	109.7	122.9	127.5	131.3	133.2	134.5	134.8
Specialized constr machinery	84.2	100.7	106.5	106.1	119.3	119.5	119.3	124.3	122.8	123.4
Portable air compressors	93.6	98.0	105.4	105.4	124.8	124.8	124.8	124.8	132.0	133.6
Scrapers and graders	85.9	95.9	110.0	108.4	127.3	128.6	129.6	129.4	129.4	130.1
Air tools, hand tools	89.6	97.5	106.0	106.8	120.5	120.5	120.5	125.0	125.0	125.0
Mixers, pavers, etc	89.3	95.6	107.7	105.9	117.9	118.5	117.7	122.9	122.7	126.7
Tractors, non-farm	84.1	95.0	110.1	110.3	123.9	126.6	131.1	139.5	141.6	142.9

All types by year and month

	1947	1948	1949	1950	1952	1953	1954	1955
Av.	90.0	101.8	108.3	111.5	125.5	129.3	131.6	.....
Jan.	86.3	95.8	108.7	108.0	124.6	126.2	131.2	133.2
Feb.	86.9	95.4	108.7	108.0	125.2	126.2	131.5	133.8
Mar.	87.0	97.3	108.6	108.0	125.2	127.1	131.7	133.8
April	87.5	97.5	108.5	108.0	124.9	128.6	131.6	134.1
May	88.5	97.6	108.3	108.2	125.5	129.1	131.5	134.3
June	89.5	99.5	108.3	108.1	125.4	129.4	131.5	134.7
July	90.3	101.4	108.3	108.8	125.4	130.8	131.5	134.7
Aug.	90.9	104.1	108.1	112.6	125.3	130.5	131.5	.....
Sept.	91.4	106.7	108.1	114.6	125.8	130.9	131.6	.....
Oct.	92.3	108.0	108.1	115.6	125.8	131.0	131.6	.....
Nov.	93.7	108.6	108.0	116.2	126.2	131.1	131.8	.....
Dec.	94.7	108.7	108.1	121.7	126.3	131.1	132.6	.....

Construction Equipment Cost Index, 1926 = 100

By Marshall & Stevens, Chicago

1913	63.0	1924	107.2	1935	79.7	1946	124.2
1914	59.2	1925	105.4	1936	83.0	1947	150.3
1915	61.2	1926	100.0	1937	87.2	1948	161.1
1916	67.5	1927	95.9	1938	82.9	1949	161.1
1917	88.2	1928	96.8	1939	82.4	1950	166.2
1918	122.6	1929	91.0	1940	83.4	1951	177.3
1919	129.0	1930	86.1	1941	92.0	1952	177.8
1920	154.4	1931	77.6	1942	100.8	1953	179.6
1921	119.7	1932	71.9	1943	101.3	1954	183.0
1922	83.5	1933	71.8	1944	101.6	6/55	185.8
1923	97.3	1934	76.0	1945	102.5	....	.....

Construction Equipment Rental Rates

Associated Equipment Distributors, Chicago, Ill.

All rates are fob lessor's warehouse or shipping point. Lessee pays transportation costs to destination and return. Rates do not include operator, fuel or oil. Lessor bears cost of repairs due to normal wear and tear on non-tractor equipment, the lessee bears all other costs. For tractor and rubber-tired hauling equipment, the lessee bears all costs for maintenance and repair. Rates are based on one shift of 8 hours per day, 40 hours per week, 175 hours per month of a 30 consecutive day period. Overtime is prorated on a per-hour basis. Equipment is delivered to lessee in good operating condition and returned in as good condition less normal wear. Excessive cleaning or repairs may be charged to lessee. Rental rates start when equipment leaves lessor's delivery point. All rents are payable in advance. No insurance, license, sales or use taxes are included in these rates.

EQUIPMENT RENTAL RATES vary greatly throughout the United States, depending upon local practices and conditions. A compilation of prevailing rental rates (representing as nearly as could be determined an over-all average of rental rates throughout the United States for specified types of equipment) has been made for informational purposes only by the Associated Equipment Distributors, 30 East Cedar St., Chicago, Ill., and is available at $5 per copy. Selected items from the Seventh Edition published in 1955 are reported here.

Type of equipment	Per month	Per week	Per day
Air compressors, portable:			
Gas, 85–125 cf, 100 psi	$198.00	$65.50	$20.00
Gas, 125–185 cf, 100 psi	246.00	82.25	25.25
Gas, 185–250 cf, 100 psi	337.00	111.00	33.25
Gas, 250–365 cf, 100 psi	455.00	149.50	45.25
Diesel, 185–250 cf, 100 psi	422.00	139.75	43.50
Diesel, 250–365 cf, 100 psi	542.00	177.00	56.00
Diesel, 365–600 cf, 100 psi	861.00	286.00	90.25

Type of equipment	Per month	Per week	Per day
Air tools:			
Clay spades, incl. scoop	33.75	12.50	3.85
Drifters, medium	84.00	27.75	8.70
Hoists, 1501–2500 lb singl dr	86.25	28.50	9.15
Hoists, 2501–3500 lb singl dr	107.00	35.75	11.75
Hose, ¾ in, per 50 ft length	8.35	3.65	1.60
Pavement breakers, 1–69 lb	42.75	15.00	4.65
Pavement breakers, 70–95 lb	46.75	16.25	5.10
Rotating rock drill, 1–50 lb	42.75	15.00	4.65
Rotating rock drill, 51–68 lb	47.00	16.25	5.25
Rotating rock drill, 69–80 lb	52.50	17.75	5.65
Tampers, single	33.00	12.25	3.85
Vibrators, pneu pwr flexible, 20–35 lb	58.00	19.00	6.10
35–50 lb	64.50	21.25	7.15
Wagon drill, with air hoist, medium	219.00	70.50	23.00
heavy	248.00	81.25	27.25
Boilers: Vertical, 20–25 hp	145.00	.....	.....
Vertical, 50–60 hp	232.00	.....	.....
Horizontal, 55–70 hp	264.00	.....	.....
Horizontal, 90–125 hp	388.00	.....	.....
Buckets: Clamshell, ⅜ cy	94.00	31.00	10.25
Clamshell, ¾ cy	134.00	44.75	14.50
Clamshell, 1½ cy	204.00	67.00	21.75
Concrete, bottom dump, 1 cy	56.50	19.50	6.85
Concrete, bottom dump, 2 cy	92.50	28.75	9.85
Dragline, 1 cy	116.00	38.75	13.25
Dragline, 1½ cy	148.00	48.75	15.50
Dragline, 2 cy	177.00	58.00	18.75
Bulldozers—see tractors			
Concrete carts, power driven:			
Manually guided	82.25	29.75	8.95
Carriers operator	121.00	41.00	12.25
Cranes, cap at ft radius:			
Crawler, gas 5–6⅛ ton, 10′	681.00	214.00	71.25
7⅜–8¾ ton at 12′	886.00	287.00	95.75
24½–33½ ton at 12′	1,612.00	520.00	171.00
Crawler, diesel			
5–6½ ton at 10′	760.00	238.00	78.75
7⅜–8¾ ton at 12′	972.00	311.00	104.00
24½–33½ ton at 12′	1,915.00	615.00	200.00
Truck mounted, gas			
5–7 ton 10′	913.00	285.00	90.00
17½–20 ton at 10′	2,165.00	698.00	210.00
30–35 ton at 10′	3,898.00	1,364.00	452.00
Dragline excavators:			
Crawler mounted, gas ¾ cy	1,087.00	351.00	111.00
Crawler mounted, gas 1½ cy	1,906.00	605.00	196.00
Crawler mounted diesel ¾ cy	1,216.00	392.00	127.00
Crawler mounted, diesel 1½ cy	2,207.00	702.00	233.00
Truck mounted, gas ¾ cy	2,175.00	672.00	211.00
Truck mounted, diesel ¾ cy	2,319.00	722.00	221.00
Engines:			
Diesel, with clutch 70–90 hp	328.00	103.00	35.75
Diesel, clutch, 115–140 hp	480.00	147.00	53.50
Diesel, clutch, 165–185 hp	813.00	272.00	91.50
Finishing machines:			
Bituminous machines, crawler, self-powered, diesel	1,638.00	579.00	148.00
Conc floor, powered, 30–36″ d.	87.00	29.50	9.50
Conc highway finisher, 10–15′.	837.00	263.00	79.00
Pile hammers:			
McKiernan-Terry #S-3	312.00	103.00	.....
McKiernan-Terry dbl-actg #1.	80.50	26.00	9.95
dbl actg 9B 2 or 3	328.00	106.00	35.00
Vulcan, single acting #1	415.00	135.00	.....
Vulcan, double acting, #50C	502.00	.....	.....

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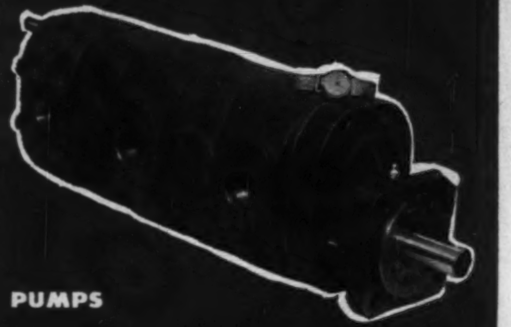


PUMPS

VALVES

CYLINDERS

MOTORS

YOU'RE PAYING FOR AN OIL HYDRAULIC SYSTEM-WHY NOT GET IT?

"Commercial" Fluid Power Controls Keep Construction Equipment On The Go

Heavy duty constant delivery hydraulic pumps developing from 2 to 100 gpm will give trouble-free dependable service even though operating pressures go as high as 1500 psi—with side or end porting, flange or pad mounting, splined or round shafts, split flange on threaded connections. More than one pump, each independent of each other, can be mounted on a common shaft in a unit.

Finger tip directional control valves with positive hold in each action have non-restricted capacity up to 35 gpm to pressure up to 2000 psi. Control from any combination of manifolds having single action, double action or double action with float can be assembled into a multiple unit. Solid spool construction with either spring return or poppet detents are standard.

For powered in-line motion in the hydraulic system you can depend on these slim silhouette heavy duty single acting and double acting cylinders. Standard in many styles of plunger fittings and cylinder mountings. They are available with stroke up to 45 inches and capacities up to 25 tons—working pressure up to 1500 psi. Multiple sleeve telescopic cylinders with stroke up to 84 inches have low shut height.

Rotary motion applications in the hydraulic system perform better when powered by "Commercial" rugged heavy duty constant delivery motors which convert fluid power at pressures up to 1500 psi into mechanical power up to 35 hp. Features of the "Commercial" pump are likewise common to these motors. More and more applications are now practical because of "Commercial's" new fluid motor.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
YOUNGSTOWN 1, OHIO · CHICAGO, ILLINOIS · SALT LAKE CITY, UTAH

COMMERCIAL
shearing and stamping

Products Preferred by Customer Acceptance

KA

Equipment Rental Rates—AED

Continued from preceding page

Type of equipment	hp	Per month	Per week	Per day
Hoists:				
Air, 1500–2500 lb single dr		$86.25	$28.50	$9.15
Air, 2500–3500 lb single dr		107.00	35.75	11.75
Chain, up to 1½ ton		20.00	6.80	2.15
Chain, 2½ to 4 ton		33.25	12.25	4.15
Gas, single drum, 14–22 hp		81.00	27.00	8.60
Gas, single drum, 29–42 hp		129.00	43.25	14.75
Gas, double drum, up to 22 hp		106.00	36.75	11.25
Gas, double drum, 28–45 hp		158.00	55.00	17.00
Elec. single drum, 17–27 hp		94.25	30.50	.....
Elec. double drum, 17–27 hp		121.00	38.00	.....
Elec, three drum, 47–57 hp		275.00	90.50	.....
Mixers, concrete:				
Tilting dr, low charg 0–3½ cf		60.75	21.25	6.95
Non-tilting drum,				
low charger 3½–6½ cf		81.25	28.00	9.00
power charger, 3½–6½ cf		165.00	54.75	13.75
power charger, 10½–12 cf		182.00	64.25	21.50
Paver, #34-E, single drum		2,308.00	727.00	.....
Pumpcrete, conc pump, remix:				
Gas, Mod. 160 single cyl		776.00	264.00	.....
Gas, Mod. 200 double cyl		1,982.00	645.00	.....
Elec, Mod. 160 single cyl		858.00	281.00	.....
Elec, Mod. 200 double cyl		2,155.00	696.00	.....
Pumps:				
Centrifugal, gas 2" 7–10M		55.75	19.25	6.20
Centrifugal, gas 3" 15–20M		70.25	24.25	7.85
Centrifugal, gas 4" 30–40M		107.00	36.50	11.75
Centrifugal, diesel 6" 90M		258.00	83.25	26.50
Diaphragm, force or open,				
3" single		58.00	20.75	6.60
4" single		67.75	22.50	7.50
Rollers:				
2-wheel tandem, 3½–5 ton gas		302.00	98.00	29.25
2-wheel tandem, 12–15 ton gas		552.00	175.00	56.00
3-wheel, 7½–9 ton gas		438.00	140.00	45.75
2-wheel tand, 5–9½ ton diesel		475.00	152.00	47.00
3-wheel, 7½–9 ton diesel		494.00	159.00	52.50
Steam, compaction, towed				
4 wheels front, 5 rear		148.00	50.50	15.00
6 wheels front, 7 rear		167.00	57.25	17.75
Steam, compaction self-propel				
4 wheels front, 5 rear		456.00	156.50	49.50
Shovels & backhoes, dipper incl:				
Crawler, gas ¾ cy		1,176.00	365.00	114.00
Crawler, gas 1½ cy		2,012.00	638.00	214.00
Crawler, gas 2½ cy		3,299.00	1,101.00	362.00
Crawler, diesel ¾ cy		1,275.00	413.00	135.00
Crawler, diesel 1½ cy		2,271.00	734.00	243.00
Crawler, diesel 2½ cy		3,961.00	1,313.00	429.00
Backhoes, crawler, gas ¾ cy		1,145.00	359.00	117.00
Backhoes, crawler gas 1½ cy		2,011.00	629.00	211.00
Backhoes, crawler diesel ¾ cy		1,286.00	414.00	136.00
Backhoes, crawler diesel 1½ cy		2,436.00	802.00	277.00
Backhoes, truck, gas ½ cy		1,382.00	378.00	122.00
Backhoes, truck, diesel ½ cy		1,612.00	516.00	159.00
Shovel attachments:				
Shovel front, ⅜ cy		183.00	76.00	26.00
Shovel front, ½ cy		256.00	86.00	28.50
Shovel front, ¾ cy		394.00	131.00	43.50
Hoe attachment, ⅜ cy		184.00	75.00	25.00
Hoe attachment, ½ cy		285.00	93.25	31.50
Hoe attachment, ¾ cy		360.00	134.00	45.00
Trenching machines:				
Ladder type, gas 8½′, 36"		1,169.00	404.00	128.00
Ladder type, diesel 8½′, 36"		1,329.00	452.00	157.00
Wheel type, gas 5–6′, 24"		931.00	305.00	105.00
Wheel type, diesel 5–6′, 24"		1.005.00	342.00	120.00
Vibrators:				
Electric, 18 ft shafting				
⅜–⅝ hp		52.00	18.00	6.55
⅝–1¾ hp		62.50	22.00	7.20
1¾–2¾ hp		68.75	23.50	7.75
Elec, 180-cycle, gen & 1 vibr		150.00	49.00	16.00
Gas, 21 ft shafting up to 1½ hp		67.50	23.25	7.65
Gas, 28 ft shafting 2½–3½ hp.		87.75	29.25	9.75
Gas, 28 ft shafting 3½–4½ hp.		91.75	30.50	10.25
Welding machines:				
Gas eng driven, to 250 amp		94.50	31.75	9.50
Gas eng driven, 250–350 amp.		128.00	42.00	12.75
Gas eng driven, 350–500 amp.		149.00	50.00	17.75
Tractors, diesel crawler:	hp†			
AC Mod. HD5, 1955	40	553.00	181.00	59.50
AC Mod. HD9, 1955	72	968.00	327.00	105.00
AC Mod. H 16, 1955	116	1,419.00	473.00	159.00
AC Mod. HD 16-C, 1955, tc		1,574.00	531.00	172.00
AC Mod. HD21, 1955	204	1,983.00	645.00	202.00
Cat. Mod. D2, 1955	38	478.00	158.00	48.50
Cat Mod. D4, 1955	48	627.00	189.00	61.50
Cat Mod. D6, 1955	75	930.00	296.00	93.50
Cat Mod. D7, 1955	102	1,198.00	385.00	115.00
Cat Mod. D8 (DD), 1955	155	1,811.00	535.00	179.00
Cat Mod. D8, 1955, tc	191#	1,957.00	650.00	209.00
Cat Mod. D9 (DD), 1955	236	2,701.00	886.00	308.00
Cat Mod. D9, 1955, tc	286#	3,027.00	1,031.00	368.00
IH Mod. T6, 1955	33	316.00	108.00	36.25
IH Mod. T9, 1955	43	420.00	143.00	48.25
IH Mod. TD6, 1955	34	451.00	150.00	44.50
Tractors, diesel crawler—continued				
IH Mod. TD9, 1955	41	$555.00	$180.00	$56.50
IH Mod. TD 14A, 1955	66	791.00	260.00	81.00
IH Mod. TD 18A, 1955	89	1,001.00	334.00	110.00
IH Mod. TD24, 1955	161	1,612.00	543.00	183.00
IH Mod. TD24, 1955 tc	200*	1,844.00	628.00	222.00
Oliver Mod. OC-3, 1955	22	296.00	96.00	29.00
Oliver Mod. AG-6, 1955	31	348.00	103.00	38.00
Oliver Mod. AD, 1955	31	375.00	122.00	42.00
Oliver Mod. OC-12, 1955	45	542.00	175.00	59.00
Oliver Mod. DD, 1955	61	664.00	219.00	70.00
Oliver Mod. OC-18, 1955	133	1,257.00	408.00	126.00
Bulldozers, for tractor of:				
Up to 42 hp (drawbar)		146.00	48.00	16.25
66–89 hp		224.00	71.50	23.75
135–150 hp		327.00	107.00	35.25
Tractor loaders:				
Crawler mounted. 1–1½ cy		828.00	267.00	79.75
Rubber mounted diesel,				
2-whl drive ¾–1 cy		605.00	192.00	62.75
4-whl drive 1¼–1½ cy		1,097.00	360.00	126.00
Rubber mounted gas.,				
2-whl drive ⅝–¾ cy		500.00	166.00	51.75
4-whl drive 1–1¼ cy		801.00	285.00	94.50
Tractors with cable scrapers:				
2-wheel tractor with 2-wheel cable scraper (heaped mass)				
6½ to 8 cy		$1,457.00	$486.00	$158.00
11½ to 14 cy		2,223.00	766.00	244.00
17 to 19 cy		2,477.00	753.00	248.00
17 to 20 cy		2,963.00	945.00	305.00
4-wheel tractor with scraper:				
8½ to 15½ cy		1,488.00	440.00	129.00
11½ to 15 cy		1,490.00	465.00	111.00
11 to 14 cy		2,415.00	.....	.....
17½ to 23 cy		2,764.00	917.00	280.00
Graders:				
Diesel, up to 16,500 lb		583.00	187.00	57.00
Diesel, 16,501–22,000 lb		797.00	261.00	81.00
Diesel, 22,001–24,000 lb		947.00	315.00	96.00
Diesel, over 24.000 lb		1,032.00	326.00	103.00
Rollers, sheepsfoot, double dr:				
42" diam, 48" length		160.00	57.50	16.75
60" diam, 60" length		374.00	130.00	41.50
Rooters:				
Heavy, 7,001–11,000 lb		248.00	77.50	23.75
Scrapers, without power units:				
Heaped mass 7–10 cy		459.00	147.00	48.00
Heaped mass 13½–17 cy		715.00	226.00	70.00
Heaped mass 17–22 cy		944.00	311.00	99.00

*† drawbar hp   *# hp at flywheel

*tc torque converter drive

** torque converter drive—hp figures represent net engine hp

Equipment Rental Rates +15%

California Department of Public Works, Division of Highways

Operators not included. Rates do include cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance, depreciation, storage, insurance and all incidentals. Rental time to be paid for is time equipment is in operation on force account work plus time necessary to move equipment to work and return it to its original location. State pays transportation, loading and unloading charges.

These rates plus 15% are paid except that in no case shall the rates paid exceed those of established distributors or equipment rental agencies.

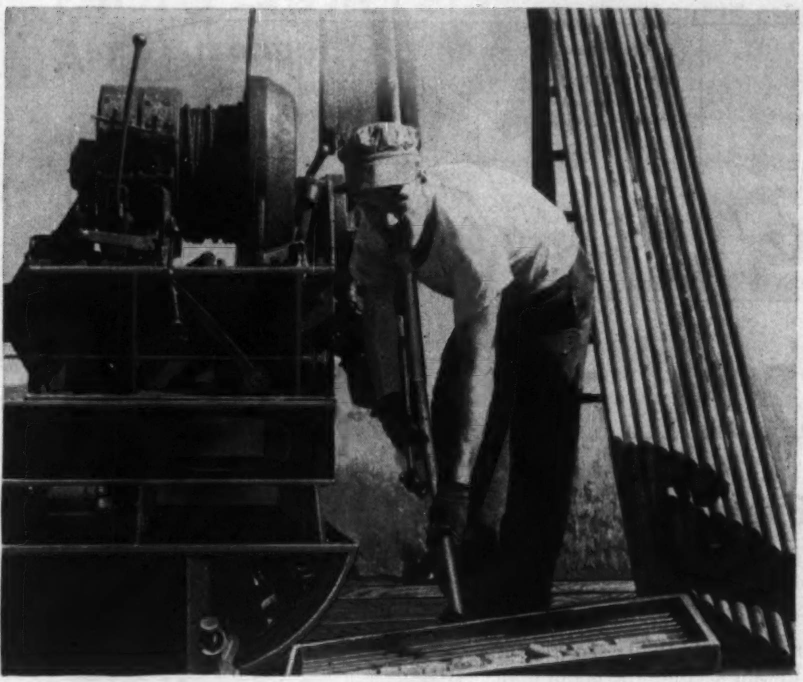
Type of equipment

Air compressors, self-contained power unit, portable, single" & 2-stage, water or air cooled, gasoline or Diesel engine· Rates incl pipe, 50 lin ft of hose, hose whips, fittings and couplings, with or without idler, unloader, hour meter, automatic oiler and starter)

Capacity, cf/m	Rate/hr	Capacity, cf/m	Rate/hr
0 to 65 incl	$1.80	210 to 315 incl	$4.40
65 to 85 incl	2.00	315 to 365 incl	5.00
85 to 105 incl	2.15	365 to 425 incl	5.20
105 to 160 incl	2.65	425 to 500 incl	5.55
160 to 210 incl	3.30	500 to 600 incl	6.50
Additional air hose, per 50-ft of hose			0.20
Air tools, chippers, trench diggers, spaders, jack hammers, paving breakers, tampers, grinders, sheeting drivers . . . ea			0.35
Wagon drills, with air hoist . . . ea			1.00
Drill steel, set of 1–5 pcs, with rose point bits or threaded with jackbits . . . set			0.60
Drill steel and Moil Point sharpening charge . . . ea			0.35
Concrete mixers, incl measuring tank, batchmeter and pumps when required, 4½ cf and smaller			0.90
4½ cf to 6 cf incl	$1.00	8½ cf to 12 incl	1.60
6 cf to 8½ cf incl	1.15	12 cf to 16 incl	2.25
Distributors, bituminous, pressure, incl pump & spray bar			
up to 800 gal	$5.00	1401 to 1800 gal	7.00
801 to 1400 gal	6.00		
Light plants, portable, incl wiring and lights. Gasoline or Diesel engine, AC or DC		up to 1,000 watts	0.40
1,100 to 1,750 watts	$0.50	4,500 to 6,000 watts.	1.25
1,750 to 2,900 watts	0.60	6,000 to 9,000 watts.	1.35
2,900 to 4,500 watts	0.85	9,000 to 12,000	1.50
Lanterns, bombs or torches, incl fuel filling & servic.			0.50
Pumps, centrifugal, portable incl power hoses, suction & discharge, foot valve & fittings, self priming			
1½" 3 Mg/hr	$0.70	4" 30–40 Mg/hr	1.95
2" 7–10 Mg/hr	0.95	6" 70–90 Mg/hr	2.70
3" 15–20 Mg/hr	1.40	8" 125 Mg/hr	3.50
Loaders, crawler tractor type, incl tractor with attachments, front end or overhead, 20–33 hp, ½ cy			4.10
34–43 hp, ½–¾cy	$4.80	65–85 hp, 2–3½ cy	10.20
34–43 hp, 1⅛ cy	6.40	86–135 hp, 2.7–9 cy	13.60
Loaders, front end wheel type, incl tractor with attachments, gasoline or Diesel engine, ⅛ cy			3.25
⅜ cy bucket	$3.50	1 cy bucket	4.75
½ cy	3.90	1¼ cy	5.25
¾ cy	4.30	1½ cy	6.25
Motor graders, Diesel & gasoline, single or tandem drive, all wheel & all steer, 0–13,998#, 30–50 hp			4.10
13,999–19,700#, 40 plus hp			5.25
19,701# plus, 60 hp plus			6.00
Rollers, road, gasoline & Diesel, 3-wheel, 2-wheel tandem, 3-wheel tandem, 5–7.9 tons loaded			2.70
8–9.9 tons loaded	$3.30	12 tons loaded & up	4.50
10–11.9 tons loaded	3.75	(Mfrs rated capacity)	
Rollers, rubber-tired, incl wobble-wheel			
2–9 wheel, 9 tons loaded			1.00
9–13 wheel, 13 tons loaded			1.50
Rollers, tamping & grid, single drum			0.60
double drum	$0.85	Triple drum	1.00
Rooters, rippers & scarifiers			
Light, 3,500 lb & under	$1.00	Heavy, 7,001–11,000.	1.75
Med, 3,501–7,000 lb	1.50	Xtra hvy 11,001 up	2.00

Type of equipment					Rate/hr
Scrapers, without power units, 0–3¾ cy					$1.70
3¾–5 cy	$1.80			13½–16 cy	3.75
5–7½ cy	2.60			16–20 ½ cy	5.10
7½–10 cy	2.75			20½–27 y	5.50
10–13½ cy	3.75			(struck measure)	
Shovel, power-crawler, gasoline or Diesel, as shovel, backhoe, dragline, clamshell, pile driver, crane complete with bucket and boom factory length and attachments (capacity when used as power shovel)					
⅜ cy	$5.35	1 cy	$9.25	2 cy	16.50
½ cy	6.00	1¼ cy	11.00	2¼ cy	17.50
⅝ cv	7.00	1½ cy	12.50	2½ cy	19.00
¾ cy	8.00	1¾ cy	15.00	3 cy	24.00
Shovel, truck mounted, as shovel, backhoe or drag-line, ¼ cv (capacity as power shovel)					4.75
⅜ cy	$6.50			¾ cy	9.75
½ cy	7.25			1 cy	10.50
Shovel, truck mounted, as crane, clamshell, pavement breaker or pile driver, complete with boom & bucket					
5,000–9,500#, 10′rad	$4.00			18,000–24,000#, 10′	8.75
9,500–14,000#, 10′rad	6.00			24,000–29,000#, 10′	10.00
14,000–18,000#, 10′rad	6.75			29,000–40,000#, 10′	11.00
Tractor accessories, angle, bulldozers, U-dozers and backfiller attachments, for crawler tractor					
up to 42 hp	$0.60			90–135 hp	0.80
43–66 hp	0.65			136 hp up	1.05
67–89 hp	0.75			(drawbar horsepower)	
Power control unit, either hydraulic or cable					
Single drum, 1 or 2 valve					0.45
Double drum, 3 valve					0.70
Tractor wagons, 8–9 cy struck	$2.75			17 cy	3.25
Tractors, crawler, Diesel and gasoline					
AG, AD,D2, TD6, T6, OC, HG,				20–33 hp, drawbar	3.00
BD, BG, HD5, TD9, T9				34–41 hp	3.25
D4				42–46 hp	3.75
				47–52 hp	4.25
TD14, HD7, DD, DG, TD14A				53–62 hp	4.75
D6, HD9				63–72 hp	5.35
D7, TD18, HD10, TD18A				73–89 hp	6.00
D8, FDE, HD14, HD15, FD, FDLC, OC18,				90–135 hp	7.25
HD20, TD24, D8 Super				136–165 hp	9.20
Tractors, 4-wheel, rubber tired gasoline or Diesel					
16–24 hp	$2.35			90–103 hp	6.25
25–35 hp	2.50			104–115 hp	7.50
36–46 hp	2.50			225 hp	11.00
Tractors, 2-wheel, rubber tired with scraper, gasoline Diesel or butane, incl power control units					
80–100 hp, 6–10 cy struck					9.25
101–145 hp, 13–17 cy struck					10.25
146–160 hp, 10–14 cy struck					11.00
161–200 hp, 13–17 cy struck					12.50
Trucks, pickup, flat rack, stake body or tractor truck					
Passenger car or station wagon					1.10
Pickup, ½-ton					1.10
¾ ton	$1.25	3 ton	$3.00	5 ton	4.25
1 ton	1.50	3½ ton	3.30	6–9 ton	5.00
1½ ton	1.75	4 ton	3.60	10–14 ton	5.50
2 ton	2.25	4½ ton	3.80	15–18 ton	6.50
2½ ton	260	(Manufacturer's capacity)			
Power winch, add					0.65
Front wheel drive on 1½-ton or more, add					0.35
Tandem axle drive, add					0.35
Water trucks, add					0.20

Continued on page 319



FOUNDATION EXPLORATION

The Delaware Memorial Bridge, Pennsylvania Turnpike, New York State Thruway, Garden State Parkway, Florida Turnpike, Maine Turnpike, and the St. Lawrence River Waterway Project, are only a few of the important engineering achievements for which we have been privileged, in recent years, to make some, or all, of the foundation test borings.

For more than seventy years we have been leaders in the field of Core Drilling, Soil Sampling and other types of testing for the foundations of Bridges, Dams, Highways, Airports and large Buildings of every kind. Besides exploratory drilling, our service includes grout-hole drilling and pressure grouting. Today, we have a large force of expert operators and an ample supply of modern equipment that can be applied to practically any job, anywhere, on short notice.

Inquiries for all types of contract drilling work are solicited — estimates submitted promptly, without charge or obligation.

SPRAGUE & HENWOOD INC., Scranton 2, Pa.

NEW YORK • PHILADELPHIA • PITTSBURGH • GRAND JUNCTION, COL. • BUCHANS, NFLD.
EXPORT REPRESENTATIVE, PHILLIPS EXPORT CO., 100 EAST 42nd STREET, NEW YORK, N.Y.

NEW LIGHT-WEIGHT HIGH-SPEED CORE DRILLING MACHINES

Designed to meet the demand for compact units, which can be moved easily from one location to another, these new machines can also be relied upon to produce good smooth cores rapidly, at minimum expense.

A racking arrangement moves the drilling unit forward or backward, while driving casing or pulling rods, without changing the position of the sheavewheel on the derrick, with relation to the drill hole. Standard single-pole derrick permits pulling rods or casing up to 10-ft. lengths. All models can be powered by either gasoline or diesel engines, air or liquid cooled, with 3-speed transmissions.

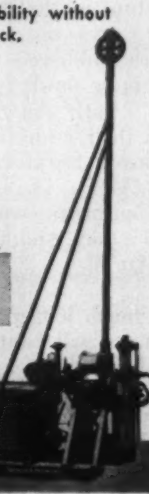
Modern simplified design includes convenient controls, machine-cut alloy-steel gears, anti-friction bearings and other improved features to assure low-cost trouble-free operation. Write for illustrated leaflets containing complete descriptions and working data.

TRUCK MOUNTED

Complete drilling rigs, mounted on 4-wheel-drive trucks with capacity for carrying accessory equipment and supplies.

TRAILER MOUNTED

for easy portability without tying up a truck.

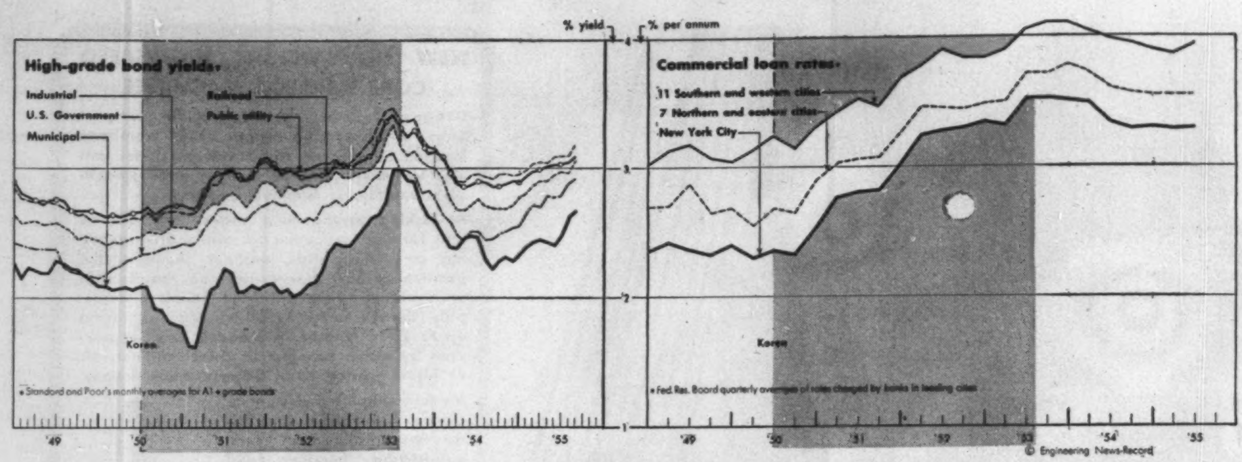


SKID MOUNTED

for jobs not easily accessible by truck or trailer. Wide structural-steel base and low center of gravity provide ample stability.

Leading Manufacturers of High-Speed Diamond Core Drilling Machines, "Oriented" Diamond Bits and a complete line of Improved Accessory Equipment for Core Drilling and Soil Sampling. Write for illustrated catalogues containing complete specifications and all necessary working data on:

Auger Bits, all types
Balls, lifting
Ball-Bearing Waterswivels
Bits, Diamond
Bits, Blank
Bits, Chopping
Bushings, Rod & Casing
Casing, Flush Coupled
Casing Taps
Clinometers
Corebarrels, all types
Corebarrel Taps
Core Lifters
Couplings, Rod
Derrick Sheaves
Drill Rods
Drilling Machines
Drive Hammers
Drive Heads
Drive Pipe
Drive Pipe Couplings
Drive Shoes
Extensions, Core Barrel
Fishing Tools
Fishtail Bits
Flush Coupled Casing
Foot Safety Clamps
Hoisting Hooks
Hoisting Plugs
Hoisting Plug Reducers
Hoisting Rings
Hose, Waterswivel
Hose, Suction
Jar Lengths
Jaws, Safety Clamp
Lifters, Rod
Mud Bits
Pilot Reamers
Plugs, Hoisting
Pressure Testers
Protectors, Casing
Reamer Shells
Reducers, Rod
Rods, Drill
Rod Couplings
Rod Taps
Rose Bits
Safety Clamps
Sawtooth Bits
Sheave Wheels
Soil Samplers
Subs
Taps, Fishing
Testers, Sample
Testers, Pressure
Wash Plugs
Water Swivels



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Higher Money Rates to Even Out Boom

For the next few months, businessmen, state and local governments, and prospective homeowners will probably have to pay higher rates to borrow long-term money for construction. The same will hold true for short-term construction loans from banks and for bank loans to contractors. The situation is subject to fast change, however, if our economy shows signs of recession. There are few such signs right now.

For about a year now, interest rates in the long-term market for bonds and mortgages have been climbing upward (left-hand chart, above). The rise was slow at first, but it has picked up momentum in the past few months. Average rates on commercial bank loans have followed the same trend, though more slowly (right-hand chart, above). Early in August, banks boosted their prime rate—the interest they charge top-credit borrowers—by ¼% to 3¼%. That means rates to other borrowers were boosted all along the line. Another ¼% hike may not be far off.

• How much longer?—The rise in interest rates will continue as long as demands for credit continue as strong as they are now. Our economy is moving into an inflationary stage, fed by higher wages, higher prices, and increases in business inventories. Though state and municipal borrowing has dropped substantially this year, business demands for long-term construction money are strong. And the year's seasonal peak for business bank loans is approaching. Demand for mortgage money should continue strong this fall, in spite of the recent decline in home starts.

• Causes—So the rise in interest rates is partly due to increased demand for money, without a corresponding increase in the supply of long-term savings. But it has also been partly caused by deliberate policies of the Federal Reserve Board, the Treasury, and other government agencies directed toward keeping the boom under control.

In two different offerings this year, the Treasury has sold about $2.7 billion of long-term bonds, reducing by that much the supply of funds available for long-term bonds of corporations and local governments, and for home mortgages. In recent months Federal Reserve has moved to restrict lending powers of commercial banks.

• Curbing the banks—Excess reserves of commercial banks have been reduced to the vanishing point. So the banks must now come to the Federal Reserve banks to borrow money if they wish to expand their loans. Federal Reserve banks around the country have recently boosted the interest rates they charge commercial banks on these loans. Both actions have the effect of making commercial banks cautious about loans, though they can still expand loans if they want to.

• Cutting off the top—FRB's policy has the purpose of "cutting the top off the boom" in order to prevent a serious recession later on. The monthly bank letter issued by New York's First National City Bank explains it this way:

"Official actions taken to restrain credit expansion are not intended to deny . . . money for soundly conceived, useful projects. The question is one of discouraging marginal and additional projects that compete . . . and raise prices against everybody. After all, supplies of labor and materials have limits; rising business costs and prices signalize in the free economy that we are trying to do too much, saving too little, drawing excessively on our credit lines."

Even if this cautious atmosphere continues through 1956, there will be plenty of money available to finance a high volume of construction. The difference is that some projects that might have been financed in a period of easy money will have to be postponed.

Bond Yields—Per Cent

Standard & Poor's

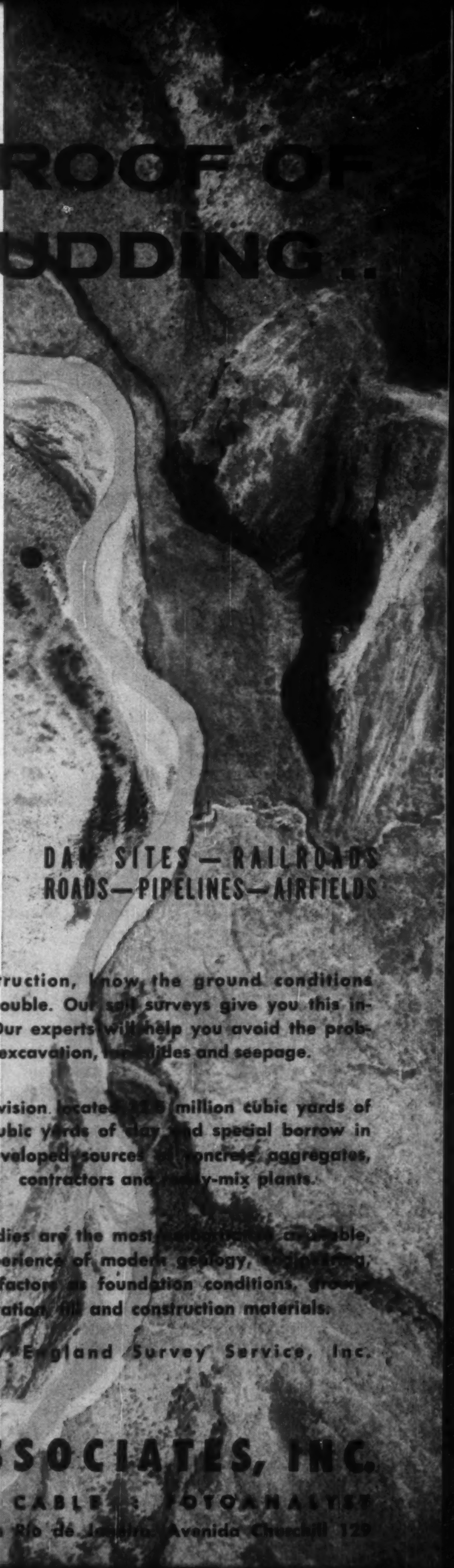
	Govt (1)	U. S. Treas (2)†	Municipal (3)	Industrial (4)	Pub Util (5)	Railroad (6)
1932	....	3.68	4.65	5.58	5.04	5.37
1933	....	3.31	4.71	4.98	4.69	4.54
1934	....	3.12	4.03	4.28	4.19	4.01
1935	....	2.79	3.40	3.73	3.59	3.58
1936	....	2.69	3.07	3.34	3.38	3.31
1937	....	2.74	3.10	3.16	3.22	3.46
1938	....	2.61	2.91	2.82	2.99	3.60
1939	....	2.41	2.76	2.64	2.83	3.39
1940	....	2.26	2.50	2.57	2.75	3.26
1941	....	2.05	2.10	2.50	2.69	3.16
1942	2.27	2.09	2.36	2.54	2.71	3.17
1943	2.29	1.98	2.06	2.55	2.64	3.10
1944	2.38	1.92	1.86	2.58	2.64	3.01
1945	2.34	1.66	1.67	2.50	2.59	2.75
1946	2.19	Disc.	1.64	2.44	2.50	2.59
1947	2.24	....	2.01	2.52	2.59	2.62
1948	2.43	....	2.40	2.70	2.83	2.89
1949	2.28	....	2.21	2.53	2.69	2.71
1950	2.32	....	1.98	2.48	2.63	2.66
1951	2.60	....	2.00	2.72	2.89	2.91
1952	2.68	....	2.19	2.87	3.01	2.98
1953	2.90	....	2.72	3.08	3.27	3.19
1954	2.51	....	2.34	2.73	2.95	2.91
J	2.65	....	2.50	2.92	3.07	3.08
F	2.58	....	2.39	2.76	2.99	2.97
M	2.49	....	2.38	2.68	2.90	2.88
A	2.44	....	2.47	2.68	2.90	2.86
M	2.51	....	2.49	2.72	2.95	2.87
J	2.52	....	2.48	2.77	2.96	2.90
J	2.44	....	2.31	2.72	2.93	2.89
A	2.45	....	2.23	2.70	2.92	2.87
S	2.49	....	2.29	2.70	2.95	2.88
O	2.51	....	2.32	2.70	2.95	2.89
N	2.54	....	2.29	2.72	2.95	2.90
D	2.56	....	2.33	2.72	2.95	2.89
1955						
J	2.65	....	2.39	2.80	2.98	2.92
F	2.71	....	2.42	2.86	3.03	2.97
M	2.70	....	2.45	2.89	3.05	2.99
A	2.77	....	2.43	2.89	3.04	3.01
M	2.76	....	2.41	2.94	3.09	3.02
J	2.77	....	2.48	2.97	3.10	3.02
J	2.87	....	2.62	2.96	3.10	3.05
A	2.91	....	2.67	3.06	3.18	3.08

(1) aver. taxable long-term government bonds to replace the long-term Treasury bond series discontinued after December, 1945.
(2) aver. partially tax exempt long-term Treasury bonds, not due or callable for fifteen years. †Federal Reserve Bulletin.
(3) aver. 15 high-grade long-term municipals.
(4) aver. A1+ industrials.
(5) aver. A1+ public utilities.
(6) aver. A1+ railroads.

PHOTO ANALYSIS AND INTERPRETATION

THE PROOF OF THE PUDDING..

Mapped 4000 miles away—but when the survey party arrived at the spot the peat sampler brought up the proof—here was buried trouble exposed in time to save expensive changes in plans and location.



DAM SITES—RAILROADS
ROADS—PIPELINES—AIRFIELDS

LOCATION Before you plan construction, know the ground conditions thoroughly and avoid trouble. Our soil surveys give you this information on *time* and *in time* for maximum use. Our experts will help you avoid the problems of peat and muck deposits, unstable soils, rock excavation, landslides and seepage.

MATERIALS SURVEYS Our Materials Survey Division located [illegible] million cubic yards of gravel and 50 million cubic yards of clay and special borrow in 1954. Our rapid and accurate surveys locate undeveloped sources of concrete aggregates, filter sands, clays and special borrow for engineers, contractors and ready-mix plants.

INDUSTRIAL SITES Our reports on area studies are the most [illegible] available, drawing on the full experience of modern geology, engineering, agriculture and transportation. They include such factors as foundation conditions, ground-water resources, climate, related housing, transportation, fill and construction materials.

Represented by: New England Survey Service, Inc.

DONALD J. BELCHER & ASSOCIATES, INC.

130 FOREST HOME DR. **ITHACA, N. Y.** **CABLES: FOTOANALYST**
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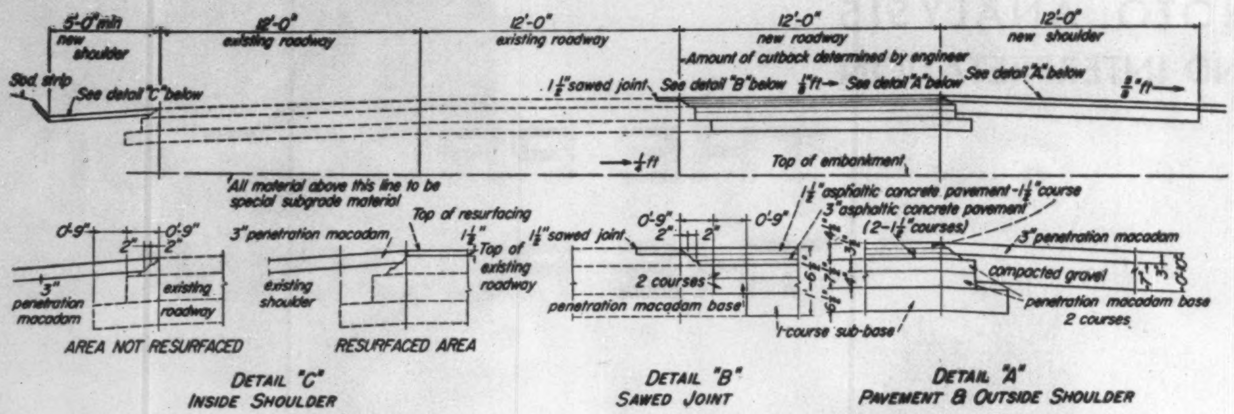

5'-0" min new shoulder
12'-0" existing roadway
12'-0" existing roadway
12'-0" new roadway
12'-0" new shoulder
Amount of cutback determined by engineer
Sod strip
See detail "C" below
1½" sawed joint
See detail "B" below
⅛" ft
See detail "A" below
See detail "A" below
⅜" ft
¼ ft
Top of embankment
All material above this line to be special subgrade material
0'-9"
2"
3" penetration macadam
existing roadway
AREA NOT RESURFACED
Top of resurfacing
existing shoulder
Top of existing roadway
RESURFACED AREA
1½" sawed joint
2 courses
penetration macadam base
1½" asphaltic concrete pavement-1½" course
3" asphaltic concrete pavement (2-1½" courses)
3" penetration macadam
compacted gravel
penetration macadam base 2 courses
1-course sub-base
DETAIL "C" INSIDE SHOULDER
DETAIL "B" SAWED JOINT
DETAIL "A" PAVEMENT & OUTSIDE SHOULDER

A THIRD LANE is being added to each roadway of the turnpike and new and more substantial outside shoulders, 12 ft wide, are being built. The inner shoulders also are being strengthened.

Protection of Traffic on N. J. Turnpike Adds Materially to Widening Costs

Making certain that the work of widening 61 miles of the New Jersey Turnpike will cause no serious delays to the steadily mounting volume of traffic using that highway is costing the New Jersey Turnpike Authority over one million dollars. The lump-sum bids on a special item for "Protection of Traffic" in the widening contracts total to that amount. But the full cost of keeping interference with traffic at a minimum will be much higher because the limits set in the contract specifications on use of traffic lanes by contractors are so strict that they must be reflected in the unit prices bid on many items.

Most of the widening work now in progress is along both sides of a 56-mile stretch from the interchange serving the Philadelphia-Camden area to the interchange at Woodbridge, N. J. North of Woodbridge the turnpike was constructed initially with six or eight lanes as far as the Lincoln Tunnel connection at Secaucus. Beyond Secaucus, the four lanes built originally are being widened to six to the George Washington Bridge connection, a distance of five miles.

• Widening urgently needed—Widening of the 56-mile section from Camden to Woodbridge is badly needed. Traffic on that part of the turnpike already far exceeds the engineers' predictions when the highway was built, and it soon will be augmented by traffic from the Pennsylvania Turnpike over the new connection that now is under construction and from the Newark Bay-Hudson County extension, which also is far advanced. The latter will provide a direct link to the busy Holland Tunnel entrance to New York.

Briefly, the current work includes construction of a third 12-ft traffic lane on the outside of both north and southbound roadways, replacement of the old 10-ft outer shoulders with new 12-ft shoulders of more substantial construction, reconstruction of the inner 5-ft shoulders along the median zone, adding to the paved widths of access lanes at interchanges, and resurfacing of the original lanes where fill settlement has made that desirable to improve riding quality.

All but two bridges carrying the turnpike over rivers, other highways or railways are to be widened, and all culverts extended. The two bridges not requiring widening are large ones over the Raritan River and Rancocas Creek, which were built originally with deck 36 ft wide for both the northbound and southbound lanes.

None of the overpasses has to be extended as all were built with spans long enough to permit construction of a third lane in each direction.

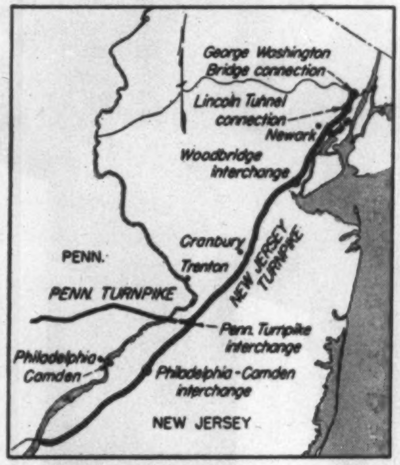
Construction of two new service areas and extensive repaving at existing service areas are being done at the same time but under separate contracts.

• Five widening contracts—Work on the 61 miles of widening is divided into five major contracts:

Contract W-1 ($380,380) is with the Belmont Iron Works, Philadelphia, for fabrication of 4,500,000 lb of steel for the bridge extension work. This steel is being erected by the widening contractors. The remaining four contracts covering the complete widening work are as follows:

Contract W-2, covering all widening work in the 16-mile section from the Camden-Philadelphia interchange to the Penn-Turnpike interchange, to S. J. Groves & Sons Co., Woodbridge, N. J., $4,965,713.

Contract W-3, widening 22.4 miles, Penn Turnpike interchange to north of Cranbury, to the Reid Contracting Co., Woodbridge, N. J., $7,303,287.


George Washington Bridge connection
Lincoln Tunnel connection
Newark
Woodbridge Interchange
Cranbury
Trenton
NEW JERSEY TURNPIKE
PENN.
PENN. TURNPIKE
Penn. Turnpike interchange
Philadelphia
Camden
Philadelphia-Camden interchange
NEW JERSEY

WIDENING to six lanes is in progress on the New Jersey Turnpike from the Pennsylvania Turnpike interchange to Woodbridge, and from the Lincoln Tunnel connection to the north end.

Contract W-4, widening 16.9 miles, from north of Cranbury to the Woodbridge interchange, to the Savin Construction Corp., East Hartford, Conn., $5,707,338.

Contract W-5, widening 5 miles from the Lincoln Tunnel interchange to the George Washington Bridge connection, to the Union Building and Construction Co of Passaic, N. J., $2,733,376.

Principal quantities involved in the work and the bid prices on the three larger contracts are given in an accompanying table.

• Asphaltic concrete paving—The paving on the new lanes is similar to that of the original turnpike. It consists of a stone sub-base 6½ in. thick, a two-course penetration macadam base 7½ in. thick, and three layers of asphaltic concrete, each 1½-in. thick, giving a total thickness of 18½ in. In addition, the subgrade to a depth of about two feet is selected material, compacted to not less than 95 percent of maximum density.

Before placing the subbase, this subgrade is pretested by four passes of a rubber-tired roller having a tire load of not less than 25,000 lb and a tire pressure of not less than 140 psi.

The 6½-in. thick subbase is an intimate mixture of graded aggregate and soil binder ranging from 100 percent passing the 2-in. sieve to 5-15 percent passing the No. 200 screen. After spreading, it is rolled until a minimum density of 95 percent is obtained.

The penetration macadam base is required to be placed in two layers, 4 in. and 3½ in. thick. Stone sizes in both range from 100 percent passing the 2½ in. sieve to 0-2 passing No. 200. Choke-stone sizes are ⅝-in. and ⅜ in., with only the ⅜-in. size used following the second application of bituminous binder.

Spreading of the stone in each layer is followed by two passes of a vibrating tamper and by enough passes of a 10-ton three-wheel roller to produce a firm surface with no creeping ahead of the roller. Pretesting also is required as in the subgrade.

Application of the bituminous binder is at a rate of 0.38 to 0.54 gal per sq yd per inch of depth.

Gradation of stone in the asphaltic-concrete is similar to that in the original turnpike paving except that the top size is smaller—100 percent passing the ¾-in. sieve instead of the 1-in. sieve. The asphaltic cement ranges from 5.0 to 6.5 percent by weight. This surfacing material, as noted previously, is placed in three layers, each 1½-in. thick.

Preliminary to placing the top layer, the upper 1½ in. of the surfacing in the adjoining lane is removed back to a sawed joint located far enough from the edge to be beyond any major irregularities, generally 6 in. This is designed to insure a smooth-riding connection between the old and new work.

Where settlement of a fill has produced noticeable irregularities in the surface of the original pavement, the existing pavement is being resurfaced with asphaltic concrete.

• Stronger and wider shoulders – A major departure from the original turnpike design is being made in building new shoulders for the outside lanes. The original shoulders were 10 ft wide, of surface-treated gravel 10 in. deep. The new shoulders are 12 ft wide and 10 in. deep, made up of 7 in. of compacted gravel topped by 3 in. of penetration macadam.

Similarly, the surface treatment on the 5-ft wide inner shoulders along the median zone is being replaced by 3 in. of penetration macadam.

At the interchanges, the 5-ft wide surface-treated shoulders on the access and exit lanes are being replaced with standard turnpike pavement to increase the usable width of these lanes, most of which are curved. Lanes are being equipped with concrete curbs.

• Maintenance of traffic – Elaborate provisions for minimizing interference with traffic are set up in the specifications. From noon on Friday until noon on Monday, two-lane traffic must be maintained in both directions, and no work may be done within 12 ft of a traveled lane unless the work is separated from traffic by a continuous timber barrier curb surmounted by a railing painted with white reflectorized materials.

During the remainder of each week, traffic can be restricted to one lane on either roadway for brief periods on written permission of the engineer.

• Construction operations—Because of these restrictions on use of the turnpike, all construction operations are carried on from parallel roadways along the areas graded for the new shoulders of the widened highway. Access to these roads is by temporary

Principal Construction Operations and Costs

Type of Work		CONTRACT W-2		CONTRACT W-3		CONTRACT W-4	
		Quantity	Price	Quantity	Price	Quantity	Price
Protection of Traffic, (lump sum)		....	$360,000	....	$367,000	....	$300,000
Roadway Excavation, Earth	cu. yd.	457,000	$0.60	361,000	$0.90	314,500	$0.80
Borrow Excavation	cu. yd.	17,000	0.75*	123,500	0.90	198,300	0.70
Select Borrow Excavation	cu. yd.	189,000	0.75	400,000	0.95	260,000	1.10
Topsoiling (4-in.), Stripping or stockpile	cu. yd.	576,800	0.30	565,500	0.29	418,300	0.35
Topsoiling (4-in.), Furnished by contractor	cu. yd.	215,400	.....	386,500	0.35	390,000	0.40
Subbase	sq. yd.	251,900	0.65	354,300	0.40	266,100	0.50
Macadam Base Course	sq. yd.	252,800	2.20	354,300	1.30	265,500	2.00
Bituminous Material for Base Course	gal.	885,000	0.12	1,252,000	0.13	929,200	0.14
Asphaltic Concrete, leveling courses 3″	sq. yd.	248,500	1.45	354,300	1.58	266,000	1.50
Asphaltic Concrete, surfacing course 1½″	sq. yd.	271,500	0.75	369,100	0.79	289,500	0.90
Asphaltic Concrete, resurfacing	tons	3,190	15.00*	21,730	11.00	5,080	10.00
Remove and Replace shoulder base	sq. yd.	228,500	.....	329,700	0.38	243,300	0.30*
Shoulder Stone, Outer shoulder	tons	18,000	6.50	22,000	4.50	9,550	4.00
Pen. Macadam Surface, Outer shoulder	sq. yd.	234,300	1.25	329,700	1.26	243,200	1.50
Pen. Mac. Surface, Inside shoulders	sq. yd.	14,600	1.65	47,200	1.55	17,700	1.75*
Open Footing Excavation	cu. yd.	7,970	12.00*	10,000	12.00	5,500	12.00*
Concrete in Footings	cu. yd.	1,120	40.00	2,363	50.00	1,336	46.00*
Concrete in Piers and Walls	cu. yd.	2,065	65.00	3,648	70.00	1,816	55.00*
Concrete in Culverts	cu. yd.	1,870	70.00	1,406	68.00	450	60.00*
Concrete in Superstructures	cu. yd.	920	95.00*	2,260	85.00	1,798	85.00
Reinforcing Steel	lb.	770,900	0.12	1,051,800	0.18	714,000	0.12*
Concrete Piles, cast-in-place	lin. ft.	11,620	6.00*	15,950	9.50	3,740	6.00*
Underdrains, 8-in.	lin. ft.	17,800	2.60*	56,700	2.40	51,200	3.00
Underdrains, 12-in.	lin. ft.	....	.....	44,360	3.20	2,420	4.25*

* Unit price on items totalling under $100,000

links to highways crossing over or under the turnpike or by temporary connections to local roads outside the turnpike right-of-way.

In general, the sequence of construction operations is to reconstruct the 5-ft wide shoulders along the median, except where resurfacing of the old lanes follows wherever that is required.

As this resurfacing work necessitates single-lane traffic on the turnpike, it can only be done between Monday noon and Friday noon, which means, generally, that it only is done during the three midweek days, of Tuesday, Wednesday and Thursday.

Consequently, to keep the paving crews busy, they are switched to work on the new lanes during the other days of the week. As previously noted, that work must be done behind a barrier curb, which encroaches to a depth of 4 ft on the outer 12-ft traffic lane. However, as the 5-ft wide median shoulder has been reconstructed in most areas where that work is being done, vehicles on the turnpike have no difficulty in maintaining a two-lane flow past the area where crews are working.

• **Bridge widening**—The work of extending the bridges and widening their decks also is laid out to minimize interference with traffic. To that end, contractors are required to maintain the outer parapet walls on the old decks until piers and abutment walls have been extended and the steel to support the new deck has been set. Then the old parapet walls are removed to permit extension of the concrete deck.

• **Engineers and contractors** — This work is being done by the New Jersey Turnpike Authority under the general direction of Paul L. Troast, chairman; W. W. Wanamaker, executive director; Charles M. Noble, chief engineer; and Harold W. Goldberger, construction engineer. Howard, Needles, Tammen & Bergendoff, New York, are general consultants.

DeLeuw, Cather & Brill, New York, are consulting engineers on the 56-mile widening work at the south end, with Walter V. Gafke serving as project engineer. On the 5-mile section at the north end, Porter, Urquhart, McCreary & O'Brien are the consulting engineers, with L. Corn as project engineer.

Supervision for the contractors is under E. J. Oak for S. J. Groves & Sons; L. W. Lancaster for the Reid Contracting Co.; J. Donovan for the Savin Construction Corp.; and John DeLeeuw for Union Building & Construction Co.

Open-Deck Parking Increases

Costs and characteristics of large parking garages built since early 1954 reveal some dynamic changes in design and construction as well as in the attitudes of building officials. The accompanying roundup by ENR business news reporters analyzes 39 structures that represent all areas of the nation.

Twenty-six of the buildings were either entirely or substantially open-deck types, an indication of code changes in many sections. According to the cost figures, the open-deck ramp building has several advantages over the walled-in ramp type. Lighting and ventilating costs are reduced appreciably. Also elimination of the weight of exterior wall panels results in framing economy in addition to material savings and reduction of labor costs. As a result of these lower costs for open structures walled-in ramps—only five were reported—seem to be used only when code requirements demand them, or when site conditions are such that open-deck types are not feasible.

In all cases, total costs in tables are exclusive of land costs. The large capacity, two-and three-story garages tend to show a lower building cost per stall than the multi-story structures. Land costs, however, in downtown areas where properties are expensive, might offset the differences. Where land costs range upwards of $20 per sq ft, a 50% reduction in land area covered might make increased height an attractive alternative on a total-cost and unit-cost basis.

As more ramp type garages are built, design variations begin to appear as they have in shopping center and office building design fields. For example, waffle-pattern lift slab construction was used on an open-deck ramp garage in Los Angeles. In Fort Worth, a six-story open-deck type is reinforced concrete with prestressed concrete joists. Garage #3 in Chicago is a split-level design with the levels at one end of the building ½-story above those at the other end.

In California, where earthquake resistance must be built into structures, a 9-story open-deck ramp garage was constructed with a circular ramp that enclosed a 37-ft-long shear wall in its center area, and another West Coast structure was designed with circular ramps at diagonal corners of the building, thus omitting columns in those areas. Omission of the columns made it necessary to analyse each circular wall as two half-bucket shaped beams supporting five stories (ENR, April 29, 1954, p. 45).

Grade level access has been acieved in many of the buildings through utilization of natural ground slopes, and in some cases, the parking levels themselves have been sloped to produce the same result on level sites. Finally, such unusual applications as vertical stainless steel cable barricades and aluminum parapet facings have removed ramp garages from the factory type structures of past years.

• **Underground parking costly**—In almost every case, the decision to go underground with a parking structure or to build a conventional garage depends upon the extent to which hiding the structure—at substantially increased cost—will benefit the area in which it is to be built.

Most of the completely underground buildings are topped with landscaped parks that must have justified added expenditures in the eyes of the cities involved and their designers. In any case, the use of this land for park purposes has been the deciding factor in almost every instance. The Union Square Garage and the St. Mary's Square Garage in San Francisco are built below city parks, and the 890-car Mellon Square Garage in Pittsburgh is being topped with a garden park and fountain. The great $8.3-million, 2,359-car underground parking facility that replaced Chicago's (Ill.) Grant Park, was constructed with its roof level four feet below street grade to allow for complete restoration of the park.

• **Mechanical systems gain**—Five of the reported garage structures are mechanically served buildings. Three of these, built under Chicago's ten-structure program, are reinforced concrete construction and generally $800 higher in per-stall cost than reinforced concrete structures of comparable capacities in that area. This higher cost, however, is at least partly offset by the reduction in cubic content of the mechanically served buildings, the smaller area on which the buildings stand (in some cases less than 50% that of the ramp structures) and the faster movement of vehicles in and out of the buildings.

One similar mechanical system in Denver, Colo., shows similar cost per stall also, but parks 480 cars on a site whose area is only 12,500 sq ft. An open steel mechanical garage located in Harrisburg, Pa., parks 240 cars on a site of only 16,800 sq ft, has handled up to 120 car per hour and shows a unit cost report of $6.31 psf, $0.99 pcf and $1,450 per stall.

Cost and Capacity of Off-Street Parking Facilities Compared

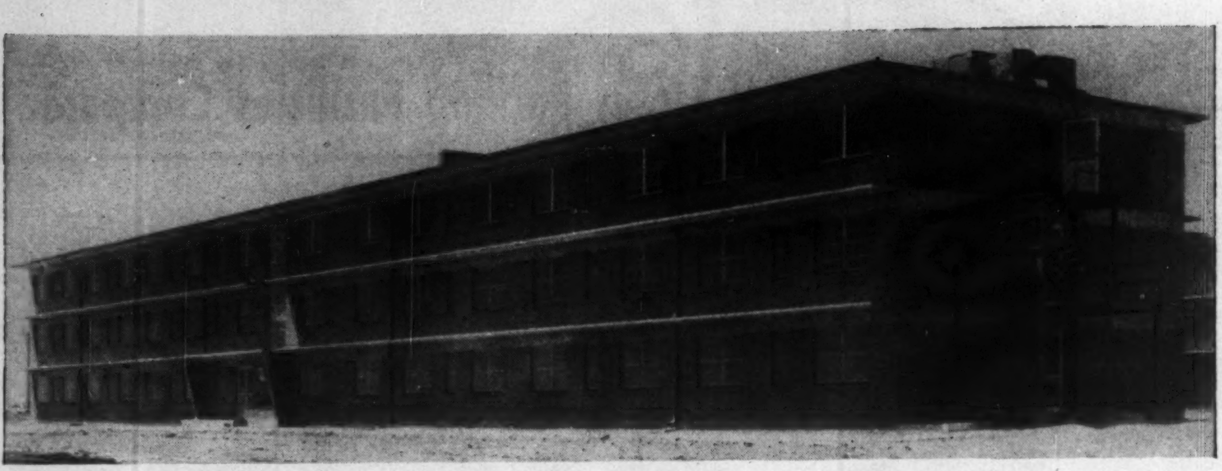
Reported to Engineering News-Record by Owners or Builders

	New England	Mid-West											South
Location	**Boston**	**Chicago (1)**	**Chicago (2)**	**Chicago (3)**	**Chicago (4)**	**Chicago (5)**	**Chicago (6)**	**Chicago (7)**	**Chicago (8)**	**Chicago (9)**	**Chicago (10)**	**Chicago (11)**	**Louisville Ky**
Cost: $/sq ft	$4.66	$7.43	$4.21	$5.14	$4.12	$6.38	$5.22	$6.21	$6.68	$5.71	$5.27	$9.42	$4.76
$/cu ft	$0.50	0.83	0.69	0.79	0.56	0.61	0.37	1.03	0.64	0.72	0.76	1.22	0.55
$/stall	$1,500.00	2,317.00	1,368.00	1,544.00	1,299.00	2,310.00	1,527.00	2,402.00	2,200.00	1,668.00	1,729.00	3,518.00	1,600.00
Total $	$1,200,000	1,657,000	1,683,000	1,027,000	1,299,000	970,000	1,842,000	615,000	1,089,000	1,084,000	453,000	8,300,000	400,000
Type of structure	WIR	M	ODR	ODR	ODR	M	ODR	ODR	M	ODR	ODR	WIR	ODR
Elevators, passenger no.	N	N	N	N	N	N	N	N	N	N	N	N	1 manlift
vehicular no.	N	5	N	N	N	4	N	N	4	N	N	N	N
vehicular type	—	SA	—	—	—	SA	—	—	SA	—	—	—	—
Type of construction	R.C., S, fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp	R.C., fp
Size: levels, above ground	3	13	4	4, split lev	5, split lev	8	4	3	12	8	4	0	3
below grade	1	1	1	0	0	0	0	0	0	0	0	2	0
total parking	4	14	5	4	5	8	4	3	12	8	4	2	3
Area, floor sq ft	257,324	223,000	400,000	200,000	315,000	152,000	353,000	99,000	163,000	190,000	86,000	880,000	84,000
Space, enclosed cu ft	2,380,210	2,000,000	2,800,000	1,300,000	2,300,000	1,600,000	5,000,000	600,000	1,700,000	1,500,000	600,000	6,820,000	721,000
Capacity, stalls, cars	800	715	1,230	665	1,000	420	1,206	256	495	650	262	2,359	250
Cars per hour	—	—	—	—	—	—	—	—	—	—	—	660	100†
Area of land occupied sq ft	64,330	21,000	85,000	52,000	65,500	19,000	131,000	31,000	15,000	42,000	23,500	322,000	20,000
Angle of stalls	90°	90°	90°	90°	90°	90°	90°	90°	70°	90°	90°	90°	90°

	Mid-Atlantic										Mid-West		
Location	**Baltimore Md**	**New York N.Y.**	**Trenton N.J. (1)**	**Trenton (2)**	**Harrisburg Pa**	**Pittsburgh Pa (1)**	**Pittsburgh (2)**	**Pittsburgh (3)**	**Pittsburgh (4)**	**Pittsburgh (5)**	**Columbus O.**	**Toledo, O O. (1)**	**Toledo (2)**
Cost: $/sq ft	$3.35	$10.00*	$6.29	$3.58	$6.31	$4.54	$6.43	$10.57	$9.99	$5.34	$4.79	$4.48	$3 87
$/cu ft	$0.69	0.83	0.87	0.60	0.99	0.59	0.91	1.24	1.36	0.89	0.64	0.50	0.43
$/stall	$1,571.00	2,083.00	2,284.00	1,311.00	1,458.00	1,412.00	1,852.00	3,932.00	2,821.00	2,101.00	1,461.00	1,008.00	1,105.00
Total $	$550,000	750,000	925,000	375,000	350,000	745,616	1,503,987	3,500,000	2,172,063	1,817,869	843,000	605,000	315,000
Type of structure	WIR	WIR	WIR	ODR	M	ODR	ODR	WIR, ODR	ODR	ODR	ODR	ODR	WIR, ODR
Elevators, passenger no.	1 manlift	N	N	N	N	N	N	N	N	N	2+2 m'lifts	1	1
vehicular no.	N	N	N	N	2	N	N	N	N	N	4	N	N
vehicular type	—	—	—	—	SA	—	—	—	—	—	2A & 2SA	—	—
Type of construction	S, R.C., fp	S, R.C., fp	R.C.	S, R.C.	S	R.C., fp	R.C., fr	R.C., fr	R.C., fr	R.C.	S, R.C., fp	R.C., fp	S, R.C.
Size: levels, above ground	4+R	5+R	2	2	5	5+R	4+R	2	7	7	4+R	3	3
below grade	0	1	2	0	0	0	1	4	¼	0	0	0	1
total parking	5	7	4	2	5	6	6	6	7¼	7	5	3	4
Area, floor sq ft	164,300	105,000	147,240	104,600	55,500	164,160	234,000	331,000	217,500	340,340	175,780	135,000	81,400
Space, enclosed cu ft	798,000	900,000	1,062,600	627,600	355,200	1,262,800	1,657,500	2,813,500	1,593,750	2,042,040	1,321,350	1,215,000	732,600
Capacity, stalls, cars	350	360	405	286	240	528	812	890	770	865	577	600	285
Cars per hour	150–200	120	480	275	120	200†	250	300	220	200†	150	120	85
Area of land occupied sq ft	16,426	15,000	96,600	52,300	16,800	27,360	39,000	48,000	30,000	48,620	38,100	45,000	22,000
Angle of stalls	90°	90°	90°	60°	90°	90°	90°	90°	90°	90°	90°	90°	62°

	West of Mississippi						Far West						
Location	**Oklahoma City Okla**	**St. Paul Minn**	**Minneapolis Minn**	**Omaha Nebr**	**Fort Worth Tex**	**Denver Colo**	**Phoenix Ariz**	**Los Angeles Calif (1)**	**Los Angeles (2)**	**San Francisco Calif (1)**	**San Francisco (2)**	**Portland Oreg**	**Seattle Wash**
Cost: $/sq ft	$3.47	$5.77	$3.61	$6.40	$3.32	$6.66	$3.06	$2.65	$2.59	$5.71	$5.33	$2.76	$5.88
$/cu ft	—	$0.49	—	0.71	0.37	0.74	0.42	—	0.38	—	—	—	—
$/stall	$1,389.00	1,111.00	860.00	1,081.33	836.00	2,083.33	1,034.00	810.00	693.00	1,667.00	1,600.00	1,012.00	2,740.00
Total $	$750,000	500,000	516,000	186,000	224,000	1,000,000	400,000	963,000	670,000	2,000,000	800,000	340,000	1,000,000
Type of structure	ODR	WIR	WRI, ODR	ODR	ODR	M	ODR, WIR	ODR	ODR	ODR	WIR	ODR	WIR
Elevators, passenger no.	1 manlift	1 manlift	N	N	1 manlift	N	N	N	N	1 manlift	1 manlift	N	N
vehicular no.	N	N	N	N	N	4	N	N	N	2	N	N	N
vehicular type	—	—	—	—	—	A	—	—	—	SA	—	—	—
Type of construction	R.C., fp	R.C., fp	R.C., fp	S, R.C., fp	R.C., fp	R.C., fp	R.C.	R.C., fp	R.C.	R.C., fp	R.C., fp	S, R.C., fp	R.C., fp
Size: levels, above ground	5+R	2+R	5	2+R	4	11	3	3	2	11	3+R	6+R	2
below grade	0	1	2½	0	2	0	0	0	1	1	1	0	2
total parking	6	4	7½	3	6	11	3	3	3	12	5	7	4
Area, floor sq ft	216,000	86,688	143,000	43,560	67,500	137,500	130,500	363,000	259,000	350,000	150,000	120,000	170,000
Space, enclosed cu ft	—	1,011,350	—	261,360	607,000	1,350,000	957,000	—	1,780,000	—	—	—	—
Capacity, stalls, cars	540	450	600	172	268	480	387	1,189	967	1,200	500	336	385
Cars per hour	75	150	125	—	70	125	100	—	—	300†	200†	60	200
Area of land occupied sq ft	40,000*	28,896	21,384	14,520	9,500	12,500	46,420	—	103,000	37,812	38,000	200,000	44,400
Angle of stalls	90°	90°	90°	90°	90°	90°	45°	60°	90°	45°	90°	90°	90°

*† estimated *** part of another structure *ODR open-deck ramp *WIR walled-in ramp *N none reported *M mechanical *A automatic *SA semi-automatic *S steel
*RC reinforced concrete *fp fireproof *fr fire resistant *R roof



NEW DORMITORIES for the Air Force have bearing-wall construction—brick and tile exterior cavity walls and tile partitions.

Brick Wall Costs in 12 Cities

Walls involving the use of brick, alone or in combination with clay tile or concrete block, are high on the list of building elements whose inplace prices are frequently sought by designers and contractors. Not usually ready at hand, such prices in a number of important cities throughout the country have been supplied for this issue by the Structural Clay Products Institute. They are the result of an analysis made by John Barbour, staff engineer of the Institute, of information gathered by the Institute's regional personnel.

Costs are given in the accompanying table for ten types of brick walls and also for hollow-tile partitions, as well as for different thicknesses of the various types of wall. The figures shown are the costs per square foot of the wall in place, including the items of materials, labor, overhead and profit. Stated in another way, they represent the average competitive bid price in the areas indicated.

The types of construction represented are those used in such structures as schools and other buildings of that size where moderate scaffolding, fairly rigid supervision and a normal amount of plumb points prevail. In this connection, the construction may also be considered typical of that used in new dormitories at such Air Force bases as Abilene, Tex.; Little Rock, Ark.; Altus, Okla.; Alexandria, La.; Fort Bragg and Goldsboro, N. C.; and Plattsburgh, N. Y. These three-story structures have load-bearing brick-and-tile cavity-wall exteriors with load-bearing tile interior partitions and concrete floors. And they have been bid as an alternate to an exposed concrete frame with concrete block curtain walls at prices that, according to the Structural Clay Products Institute, which fathered the design, have averaged 2% lower and ranged from 1% to 4% lower.

For the 12 cities shown in the table, comparable costs can be given, but San Francisco and Los Angeles have to be considered separately because of the California state code requirement that all masonry walls must be reinforced to resist seismic loads. Wall costs in these cities are, therefore, given in a separate tabulation, and include furnishing and placing of the reinforcing steel. It may also be noted, however, that 6-in. hollow tile partitions in San Francisco cost 70¢ per sq ft and that 8-in. brick-and-brick walls average $1.40 per sq ft when they are permitted to be built.

Costs Per Square Foot in Twelve Cities

Type of Construction	Wall Thick-ness	Atlanta	Birmingham	Cincinnati	Columbus, O.	Dallas	Denver	Detroit	Kansas City	Minneapolis	New Orleans	Pittsburgh	Seattle
							$ per sq ft						
Veneer on frame (Cost to include entire assembly less interior finish)	4"	1.25	1.24	——	1.55	1.30	1.35	0.89	1.05	2.10	1.39	1.33	1.20
SCR brick	6"	1.09	1.08	——	1.48	1.10	1.23	1.08	1.05	1.44	1.18	1.17	1.40
Brick and brick	8"	1.62	1.62	2.65	2.70	1.80	1.57	2.26	1.85	2.22	1.93	2.32	1.98
Brick and brick	12"	21.0	2.10	3.35	3.35	2.51	2.18	3.05	2.65	3.12	2.79	3.40	
Cavity Wall (Brick and brick)	10"	1.67	1.67	2.80	2.84	1.80	1.68	2.26	1.85	2.76	1.93	2.49	2.30*
Cavity Wall (Brick and block)	10"	1.40	1.36	2.05	2.10	——	1.40	1.89	1.60	2.00	——	1.95	
Cavity Wall (Brick and tile)	10"	1.41	1.40	2.10	2.20	1.42	1.43	1.90	1.70	2.04	1.52	2.10	
Cavity Wall (Brick and facing tile, unglazed)	10"	2.28	2.28	3.00	2.90	1.82	1.51	2.32	2.05	2.70	1.95	2.65	
Cavity Wall (Brick and facing tile, glazed)	10"	2.54	2.54	3.10	3.00	2.54	2.49	2.51	2.65	3.24	2.72	2.87	
Brick and block	8"	1.36	1.35	1.95	2.05	——	1.37	2.16	1.60	1.74	——	1.89	
Brick and block	12"	1.47	1.44	2.15	2.25	——	1.64	1.67	1.75	2.04	——	2.06	
Brick and tile	8"	1.39	1.39	2.00	2.90	1.43	1.37	1.56	1.70	1.86	1.53	1.95	
Brick and tile	12"	1.58	1.58	2.70	3.60	1.78	1.78	1.79	1.90	2.16	1.91	1.98	
Hollow tile	6"	0.55	0.56	0.70	0.65	0.73	——	0.55	0.60	0.56	0.78	0.59	
Hollow tile	8"	0.68	0.68	0.75	0.70	0.85	——	0.61	0.75	0.92	0.91	0.69	1.12
Hollow tile	10"	0.78	0.78	0.85	0.80	0.88	——	0.73	0.90	0.93	0.94	0.77	

* Cavity wall using jumbo brick—$1.50

Reinforced Brick Walls

Los Angeles

9" RGBM (reinforced grouted brick masonry) standard sized commons	$1.77
8" RGBM, oversize (3"×3½"×11½") commons	1.36
8" RGBM, Roman F. B. plus oversize commons	2.15
8" RGBM, Norman F. B. plus oversize commons	2.06
4" Roman or Norman veneer on concrete	1.35

San Francisco

8" RGBM, oversize commons	1.82
9" RGBM, oversize commons	2.07
9½" RGBM, face brick, common B. U.	2.12
8" RGBM, face brick, 4" glazed structural facing tile	3.35
12" RBGM, oversize commons	2.90

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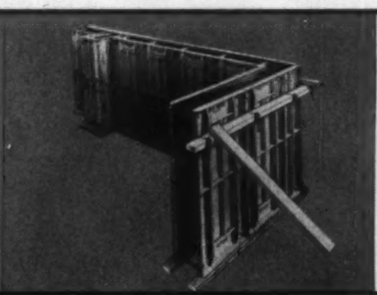

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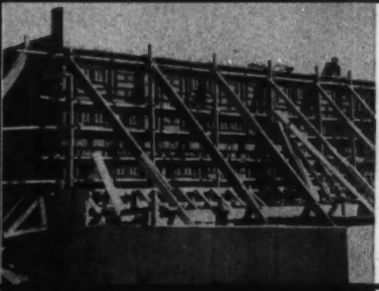

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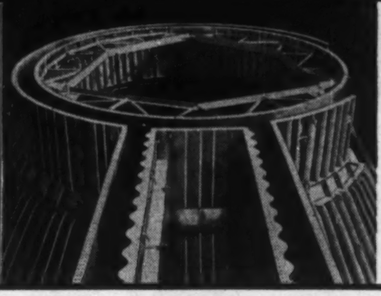

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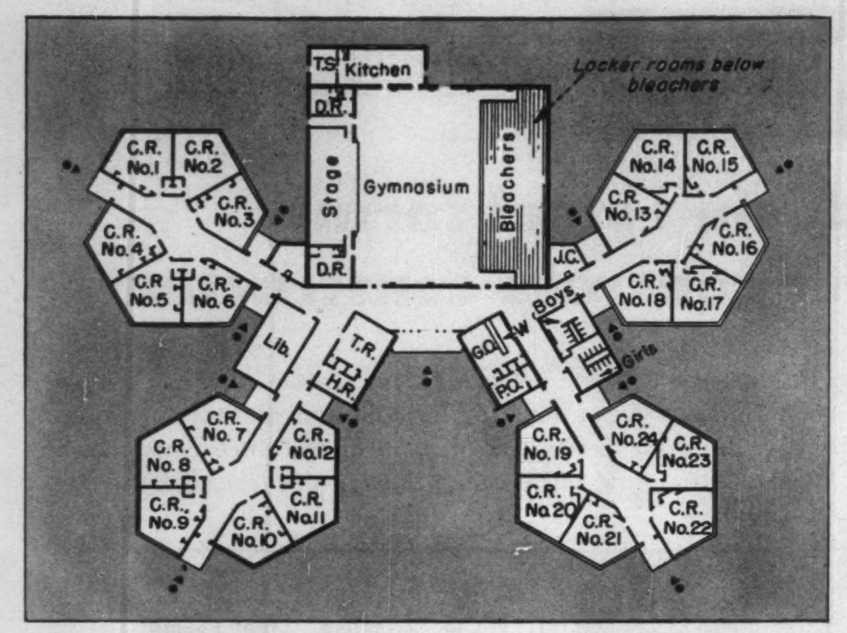

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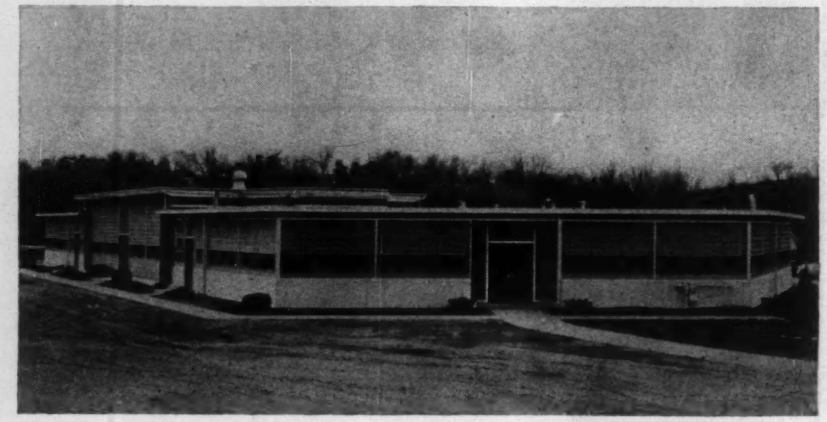


. . . Schools With 5-Sided Classrooms

While school construction costs are still hovering around $20 per sq ft in some cities, good school buildings are being erected in the Midwest at about $7 per sq ft ($0.50 per cu ft). Maintenance costs also are expected to be low.

Though designed by different architects, these low cost schools have several important elements in common. They are based on a design, called the Maximlite School, developed by T. Ewing Shelton, architect, Fayetteville, Ark. Key element is a five-sided classroom, which plays a major role in cost reduction.

• How money is saved—Advantages claimed for this design include high-quality natural lighting, satisfactory acoustics and good ventilation. Construction savings result principally from a tight plan and elimination of unnecessary decoration. Structural members are left exposed wherever possible and plaster is omitted. Windows, heating ducts and other components are standardized. And the buildings can be erected without specialized equipment or specially skilled workmen.

The buildings generally are one-story high. Around the perimeter, the roof is supported on steel columns. Interior walls are of load-bearing construction—lightweight concrete block with glazed wainscoting. There are no basements; floors are reinforced concrete slabs on ground, generally with asphalt or vinyl tile finish. Roof construction varies, in some cases being wood, in others, steel decking or open-web steel joists with gypsum or concrete deck. The decks are topped with insulation board and 20-year-bonded builtup roofing. Ceilings are fiberboard.

The exterior is reinforced concrete to sill height and glass block to the roof. The glass block is interrupted by a continuous vision strip with operable sash.

Probably the greatest savings with Maximlite Schools result from the arrangement of facilities. The five-sided classrooms are combined to form hexagons or other polygons with more sides. These shapes are economical because they yield a relatively high ratio of floor area to exterior-wall area. Also, little space is wasted in corridors.

• Two exterior walls per room—But in addition to their economical plan, the five-sided classrooms also offer the advantage of excellent natural lighting. Each has two exterior walls of glass block, which intersect at a 120-deg angle. Light is thrown upward by the glass block and reflected from the ceiling and skewed interior walls. The result is nearly uniform lighting throughout.

A test showed that with an average of 6,500-ft-c on the exterior (brilliant sun at 3 pm), light intensity on desk tops varies from 205 to 665 ft-c, or less than 4 to 1. With 1,000 ft-c on the exterior (overcast day), intensity varies from 38 to 115—again less than 4 to 1.

The shape of the rooms also facilitates good natural ventilation. In addition, the heating system introduces fresh air as desired.

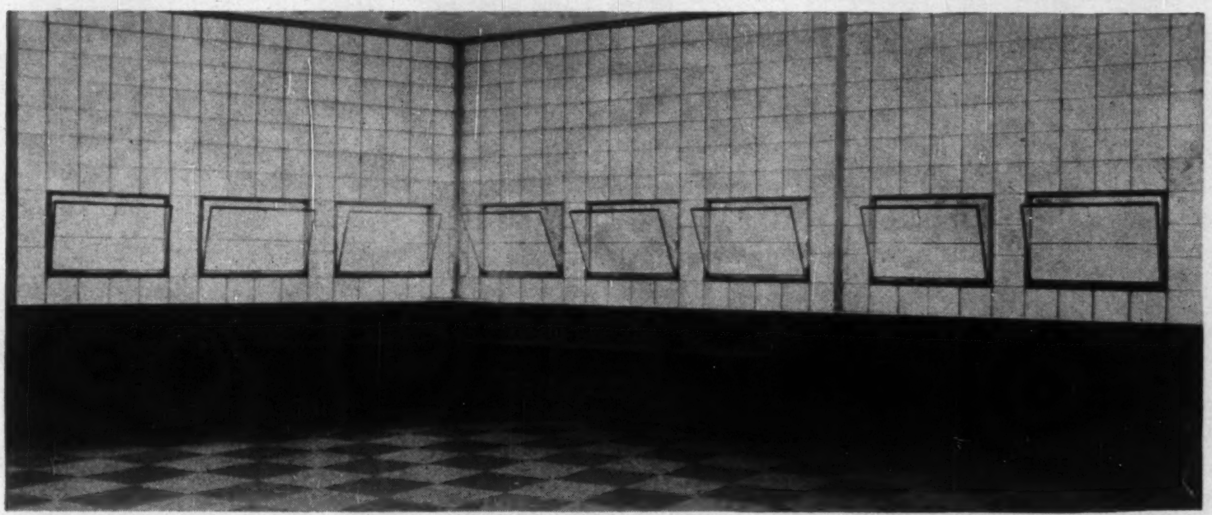
• Novel heating system—Classrooms are heated with warm air supplied by gas or oil-fired unit heaters. When gas is available, each classroom usually has its own heater (65,000 or 85,000-Btu capacity). With oil, one unit (110,000 to 170,000-Btu capacity) may be used to heat two classrooms.

The heated air is distributed through a perimeter duct system. The ducts are built into prefabricated metal bookcases, which are placed along the two outer walls of each classroom. A gas-fired heater may be incorporated in the bookcase arrangement, its top serving as a work table. Oil-fired heaters are placed in fire-resistant closets about 4 ft square at the rear of a classroom.

A 6-classroom school at Linden, Pa., with a floor area of 7,800 sq ft, was heated with No. 2 oil from Oct. 1, 1954, to Feb. 15, 1955, at a cost of only $280. During one month, the temperature went as low as −6 F and seldom exceeded 10 F, yet the heating plant proved adequate.

To date, 52 of these Maximlite schools, with 475 classrooms, have been completed or are under construction. Another 50, with 480 classrooms, now are in the planning stage.

CLASSROOMS in Maximlite Schools, such as this one in Wheaton, Mo., get excellent lighting through two glass-block walls.

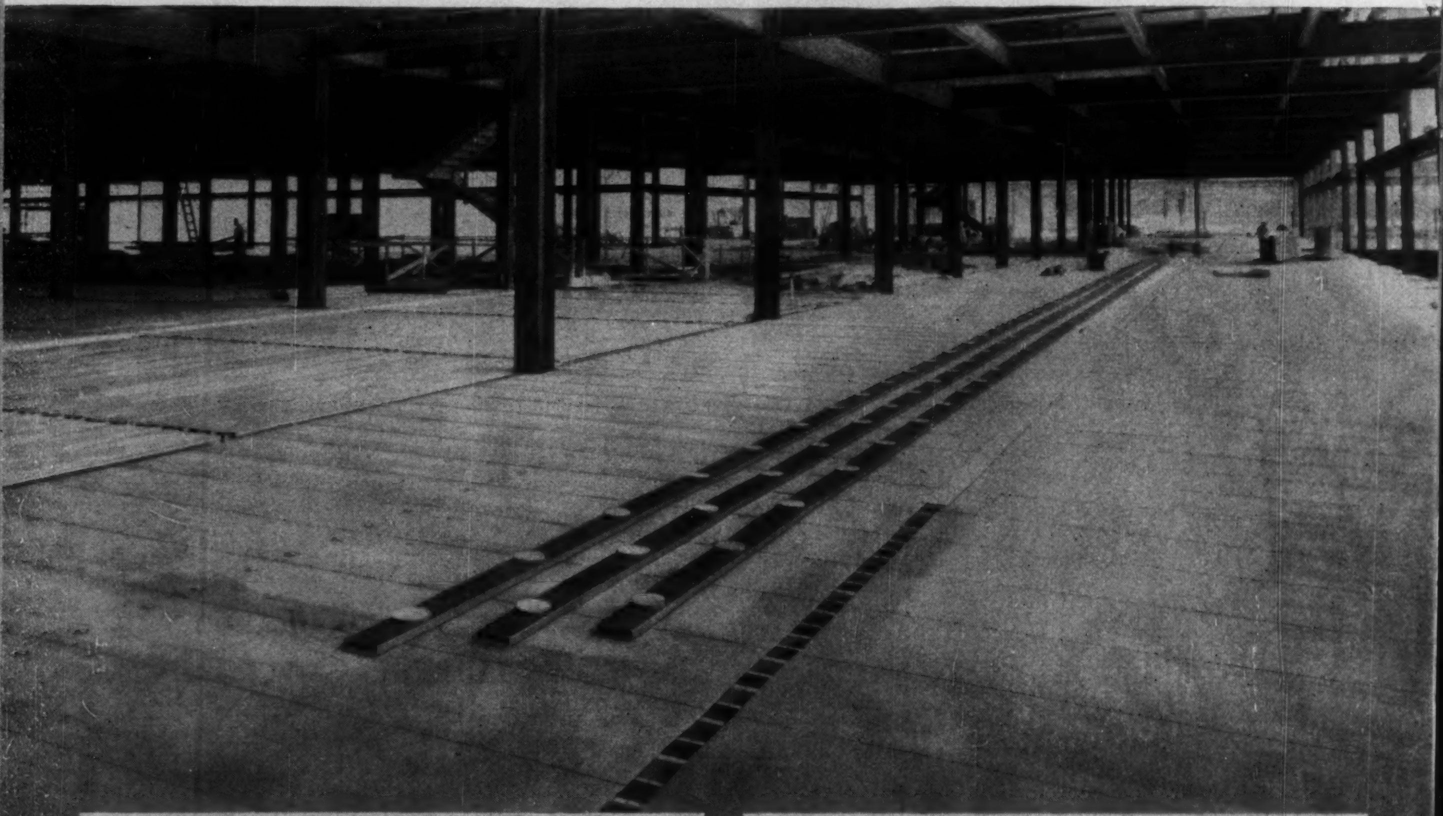


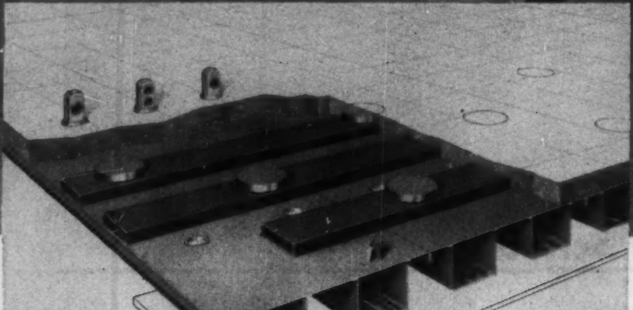
PERIMETER HEATING is achieved with warm-air ducts incorporated in metal bookcases under the windows.

Construction Costs for Maximlite Schools

Location	Date	Classrooms	General purpose rm.	Cafeteria-kitchen	Study hall	Health room	Teachers lounge	Offices	Storage	Toilets	Gymnasium	Locker-showers	Stage-dressing rooms	Total cost	Cost per sq ft
Green Forest, Ark.	1951	6	1	1	—	—	—	1	2	2	—	—	—	$68,294	$8.79
Eureka Springs, Ark.	1951	16	—	1	1	1	—	2	2	4	—	—	—	122,111	5.65
Cotton Plant, Ark.	1952	12	—	1	1	1	—	2	2	4	—	—	—	94,322	5.53
Moro, Ark.	1952	10	—	—	—	—	—	—	—	2	—	—	—	58,123	5.47
Paragould, Ark.	1952	3	1	1	—	—	—	1	—	2	—	—	—	32,706	7.59
Avilla, Mo.	1952	8	1	1	—	1	—	1	—	2	—	—	1	70,048	5.70
Pleasant Hope, Mo.	1952	8	1	1	—	1	—	1	—	2	—	—	1	81,159	6.60
Wheaton, Mo.	1952	10	1	1	—	1	1	1	—	2	—	—	—	80,355	5.92
St. Paul, Kan.	1952	8	—	1	—	—	—	3	3	2	1	2	1	128,931	6.16
Stockton, Mo.	1952	12	1	1	—	—	—	1	2	2	—	—	1	99,886	6.15
Wellsville, Mo.	1953	10	1	1	—	—	1	1	2	2	—	—	1	91,329	6.28
Branson, Mo.	1953	16	1	1	—	—	1	1	3	4	—	—	1	138,369	5.46
Haynes, Ark.	1953	5	1	—	—	—	—	1	1	4	—	—	1	45,116	6.47
Platte City, Mo.	1953	6	1	1	—	1	1	1	4	2	—	—	—	87,836	7.18
Caney, Kan.	1953	17	1	1	—	1	1	2	4	4	1	2	2	253,350	7.34
New London, Mo.	1953	8	—	1	—	1	1	1	2	2	1	2	2	129,139	6.07
South Mounds, Kan.	1953	2	1	1	—	1	1	1	2	2	—	—	—	17,600	6.40
Jasper, Mo.	1953	3	—	—	—	—	—	2	2	—	—	—	—	25,925	7.13
Carl Junction, Mo.	1953	8	1	—	—	1	—	1	2	—	1	2	2	94,156	6.34
Erie, Kan.	1953	12	1	1	1	1	1	2	1	2	1	2	2	268,535	7.38
Wrightsville, Ark.	1953	6	—	1	1	1	1	2	1	2	1	2	2	139,957	6.14
Webb City, Mo.	1953	10	1	1	—	1	1	2	1	2	—	—	—	113,524	6.69
Broken Arrow, Okla.	1954	8	1	1	—	1	1	2	1	2	—	—	—	77,900	6.66
Helena, Ark.	1954	9	—	1	1	1	1	1	—	2	1	1	—	166,228	5.73
House Springs, Mo.	1954	15	—	—	1	—	—	2	1	2	1	2	2	331,985	7.34
Grenola, Kan.	1954	6	—	—	—	1	1	1	—	2	1	—	2	149,595	7.48
Barton, Ark.	1954	8	1	1	—	1	1	1	2	2	—	—	—	86,679	6.37
Fayetteville, Ark.	1954	6	1	1	—	—	—	1	1	4	—	—	—	76,319	7.27
Kechi Center, Kan.	1954	8	1	—	—	1	1	1	2	2	—	—	—	110,466	7.90
Freeport, Kan.	1954	2	1	1	—	—	—	—	—	2	—	—	—	49,144	7.87
Offerley, Kan.	1954	14	1	1	—	1	1	2	—	4	1	2	—	265,923	7.98
Rosedale, Ind.	1954	16	—	1	—	—	—	1	2	4	1	2	—	283,517	7.40

Announcing . . .





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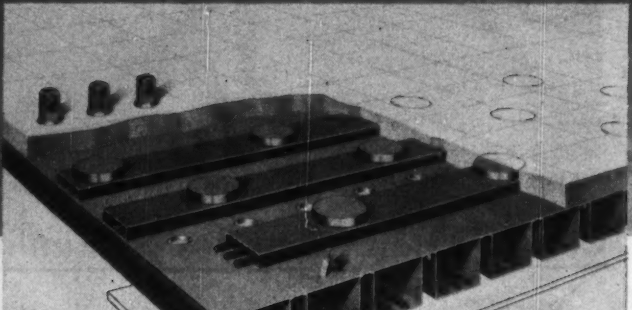

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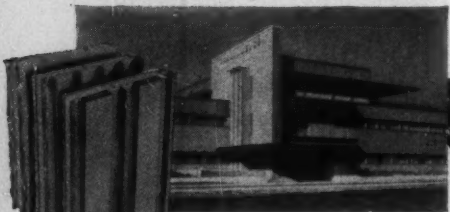

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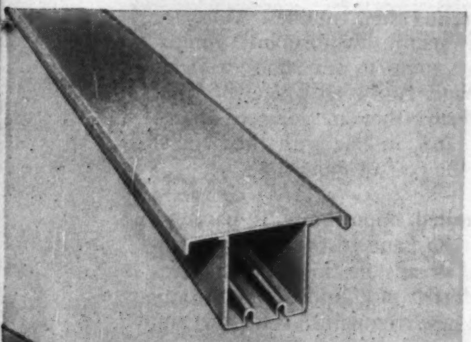
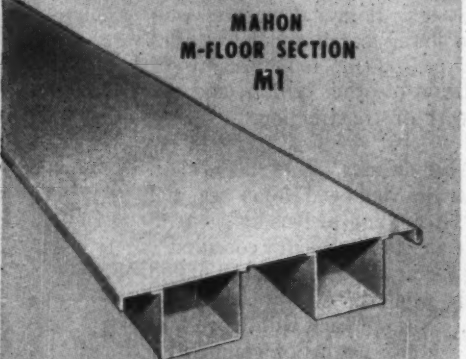
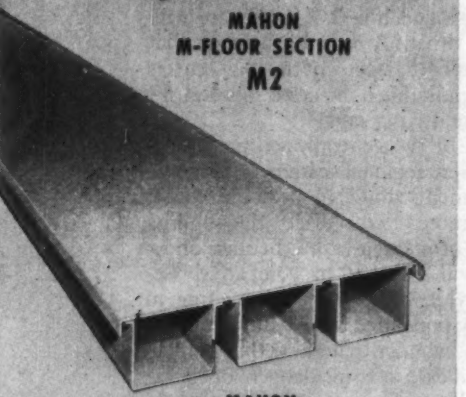


MAHON M-FLOOR SECTION M1



MAHON M-FLOOR SECTION M2



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Shopping Centers: Unit Costs and Problems

The suburban shopping center, offering easy access by car as compared with the more congested downtown business district, is a conspicuous feature of our prosperous postwar U. S. economy. It has done a good deal to sustain the construction boom by opening up new business for architects, engineers, and contractors, as well as for the more specialized "developers".

• Types of centers—We should first define our terms. There are several types of centers:

(1) The neighborhood center, usually a strip development on a main road, with some parking facilities. It sells "convenience" goods—food, drugstore items, hardware, and other things which people usually buy without shopping around. This type features one or two supermarkets, plus a drug store, variety store, and other shops. Except possibly for a second supermarket, there is no planned competition within the center though a supermarket (for instance) may sell some items you can get in a drug store or variety store.

(2) The regional shopping center, whose prototype is generally considered to be Seattle's Northgate, opened in 1950. Though several big centers were built before Northgate, it introduced the principle of admitting competing stores and grouping them together. According to one definition, a regional center has at least 50 acres of space (mostly parking), a building area over 600,000 sq ft (of which one-half to two-thirds is sales space), including at least one major department store, and located on at least two major traffic arterials. It offers both convenience goods and "shopping" goods, plus some of the services of downtown—including banking, beauty salon, dry cleaning, medical and dental services, movies. The ratio of parking space to sales space should run four or five to one.

(3) Somewhere between the regional and the neighborhood center is the "semi-regional" or "district" center. It's between the other two in size, and reaches out to a wider area than a neighborhood, but not to a whole region. A "junior" department store is the main attraction. This is usually an upgraded variety store, providing most types of soft goods but not many hardgoods lines. Or it might be a Sears, Roebuck branch.

• Unit costs—Unit costs of these centers vary widely. The unit costs shown in the accompanying table range all the way from $4.50 per sq ft for a semi-regional center in Kentucky to $22.50 per sq ft for a semi-regional on a very small plot in Nebraska.

However, the table indicates that the typical unit cost per sq ft for a semi-regional or regional center would be about $10 to $11 per sq ft, with the cost running about $8 per sq ft for the less elaborate centers. These figures are exclusive of land costs, which can vary widely. The cost per sq ft of sales space, another important measure, can also be calculated from the table.

Cost per lineal front foot is another important factor, since store minimum rentals are often based partly on valuable store frontage. Here again the semi-regionals and regionals usually have a much higher unit cost. They generally range above $1,000, while a majority of neighborhood centers in the table are below $1,000.

• Rentals—Minimum rentals are usually set at a minimum per sq ft or per lineal ft, or sometimes a combination. Typical minimums might run from $1.25 to $2.00 per sq ft annually, depending on the nature of the center and on how anxious the developer is to get a particular tenant. Front-foot rentals might range from $20 to $40 a month.

There is also a rental percentage on sales, from which the minimum rental is deducted. Sometimes this percentage is lower on sales above a certain figure. The rental percentage varies widely, depending on the type of store and on competitive conditions. For instance, last spring supermarkets were paying 1% or less in new leases. Now a more typical rate is 1½%, because food chains have started competing a little more eagerly for leases.

The minimum rentals are not based on amortization of construction cost and land cost alone. They must pay for interest on borrowed money, maintenance, management and promotion cost, and taxes. Last comes the developer's profit.

• How many more?—There are about 35 centers of the regional type already in operation or not far from it, and many hundreds of semi-regional and neighborhood centers. How much more business of this type can construction men expect in the years to come?

The answer is not a simple one. It seems quite likely that volume of shopping center construction is going to level off and perhaps decline for awhile, as developers, tenants, and investors analyze what has been happening in the past few years. We still have a great deal to learn about how shopping patterns will develop after the novelty of the big new centers has worn off. Some centers have had declines in sales.

Faulty layout and choice of building materials seem to have been major factors responsible for the default last year of the owner of Shopper's World near Boston, one of the earliest of the regionals. No other big centers have been reported as defaulting on interest payments, but owners of some are said to be having their troubles. Mortgage lenders—mainly life insurance companies—are going to get choosier about their loans. And even where they find sound loans, they are going to charge higher rates, in line with the general rise in the cost of money.

• Unlimited opportunity is passing—The Urban Land Institute, a close student of trends in this field, believes that "the day of unlimited opportunity for the new commercial centers is rapidly passing." It says a squeeze is on between lower rentals and lower sales volume per square foot because of competition of other centers, and the rising cost of construction.

• How big an area? How big a trading area do you need for a regional center? According to Robert H. Armstrong, an independent consultant, trading areas of less than 250,000 probably won't be able to support a regional center. Much will depend, of course, on the nature of competitive facilities, and how far people are willing to drive. Armstrong believes that experience has shown the big centers don't pull much business beyond 15 minutes driving range.

One of the generally-accepted theories about regional centers is that two department stores in a single center have more than twice the pulling power of a single store, because shoppers will be able to compare prices and styles. This may well be true in densely-populated areas. But some observers wonder whether the branch-store idea isn't in danger of being pushed too far.

• Branch dangers?—One downtown department store may decide to come into the center because its competitor is setting up a branch in the center, or because it wants to shut out a competitor. But there is a real danger—and some statistical evidence—that branch stores can hurt the growth of their parent store downtown. Though total sales of the whole operation increase, overhead climbs faster. As one observer put it: "Sometimes it's a case of cutting your own throat to keep somebody else from doing it."

• **Downtown advantages**—Along with all this, it should always be kept in mind that the central shopping area still has plenty of advantages.

The results of study that was conducted by the Highway Research Board (which covered Columbus, Houston, and Seattle) indicated that buyers felt downtown has: (1) greater variety of styles and sizes (2) greater variety and range of price and quality (3) more bargain sales (4) best place to meet friends from other parts of the city for a shopping trip together (5) better delivery service (6) convenience to rapid transit.

The trend to shopping center construction has by no means run its course. But some of the early glamor has worn off for developers, tenants, and investors. There may very well be a decline in this type of business for the next few years. Looking into the long-range future, however, you can expect another wave of center construction when large numbers of children born in the past 10 or 12 years get married and move into homes still further away from the old downtown business sections.

Shopping Center Construction Costs and Services

Reported by architects, engineers, owners, contractors

Location of Shopping Center	Calif 1 Southern	Calif 2 Southern	Calif 3 Northern	Calif 4 Northern	Calif 5 Northern	Arizona 1	Arizona 2	Colorado 1	Colorado 2	Colorado 3	Nebraska 1	Wisconsin 1	Wisconsin 2
Cost (exclusive of land purchase):													
of shopping center, total	$14,000,000	$6–8,000	$1,400,000	$1,625,000	$825,000	$420,000	$1,050,000	$4,450,000[8]	$386,000	$1,500,000	$4,500,000	$4,000,000	$12,273,000
of buildings, per sq ft	$10.89*	$7–15	$7–9[2]	$12.50–14[4]	$8[3]	$7*	$8.55*	$11.90	$8.26*	$7.50*	$22.50*	$10.10	$12.83
per cu ft	......	......	......	......	......	......	......	$1.16	$0.75	$0.68	......	......	$0.83
per lineal front ft	$1,959	$2,400	$700	$1,600	$1,400	$868	$1,000	$2,000	$883	$1,744	$1,509	......	$1,379
of sidewalks, per sq ft	$0.47[1]	$0.30	$0.30	......	$0.25	......	......	......[6]	$0.35	$0.50	$0.70[18]	......	$0.56
of parking area, per sq ft	$0.14	$0.30	$0.22	......	$0.17	......	......	......[8]	$0.22	$0.23	......	......	$0.52
Size: Number of Stores	16 + 1	12 & 1	......	......	......	......	......	......	......	......	40	......	51
site, acres	155	20	20	11+	14	6	10	19.8	10	13.61	5	25	63
floor area, incl basements, sq ft	1,285,009	......	150,000	140,000	59,000	60,000	122,500	311,370	46,700	200,000	210,000	337,000	860,000
sales area, sq ft	610,064	305,000	130,000	125,000	47,000	45,000	98,000	......	37,360	120,000	195,000	250,000	482,000
storage & service, sq ft	......	......	20,000	15,000	12,000	15,000	24,000	......	9,360	80,000	15,000	87,000	378,000
store fronts, lin ft	7,148	2,500	2,000	1,000	560	484	1,050	1,850	437	880	2,982	2,800[10]	8,000
enclosed space, cu ft	......	......	......	......	......	......	......	3,196,500	513,700	2,200,000	......	......	13,330,000
sidewalks, sq ft	10,000lf	50,000sf	20,000	......	12,000	6,000	17,000	50,000	13,385	15,900	16,000	......	293,000
parking area, sq ft	2,346,403	......	200,000	250,000	100,000	180,000	300,000	512,000	146,975	480,000	......	......	2,056,000
number of stalls or cars	5,481	2,300	1,000C 200E	1,000	550	400	600	1,670	415	1,201	1,600	1,837	5,250
Height, % of floor area in													
basements, %	0	0	0	0	0	0	6%	43%	0	40%	......	✓	31%
1-story buildings, %	73%	71%	93%	100%	90%	100%	94%	40%	100%	60%	......	100%	0
2-story buildings, %	0	0	7%	0	10%	0	0	17%	0	0	100% on 3 lev	✓	46%
multi-story buildings, %	(3st) 27%	(4st) 29%	0	0	0	0	0	0	0	0	......	✓	23%
Type of Construction	PC	S & PC	Post & beam[2]	TUC, PC-some	CB, TUC[5]	CB & PC	S, Brick	S3, PC1	S, Brick	C	S, PC	CB & Br,[11] PC	S, PC
Special features													
covered arcades or sidewalks	......	✓	✓	✓	......	✓	✓15-ft	......	✓	✓	6	✓	✓
enclosed arcades	......	......	......	✓	......	✓	......	✓	✓	......	6	✓	✓
air conditioning	......	✓	......	✓	......	✓	✓	✓	✓	✓	100%[17]	✓	✓
escalators, how many	......	1 set	......	......	......	......	......	......	......	......	2	......	10
elevators, how many	✓	2P, 1F, 6DW	......	......	......	......	......	......	......	......	2P, 1F	......	10
delivery truck access separated from customer access	2,300lf tunl	✓ Dpf St only	✓	✓	✓	✓	✓	......	✓	✓	2 docks	......	✓
auditorium	......	......	......	......	......	......	......	......	......	......	......	✓	✓
theater	......	......	......	......	✓	......	......	......	......	......	......	......	......
office building	......	......	✓small	......	✓	......	......	......	......	......	12 suites	✓	......
special landscaping	......	✓for shade	✓	✓	✓	✓	......	✓	✓	......	......	......	✓
other	[2]	......	......	......	......	......	......	[6]	......	......	......	[13]	[15]

Location of Shopping Center	Minnesota 1	Minnesota 2	Minnesota 3	Minnesota 4	Tennessee 1	Kentucky 1	Kentucky 2	Ohio 1 Southern	Ohio 2 Southern	Ohio 3 Northern	Ohio 4 Northern	Texas 1	Washington State 1
Cost (exclusive of land purchase):													
of shopping center, total	$1,350,000	$500,000	$987,750	$1,035,000	$6,000,000	$1,000,000	$1,500,000	$442,000	$1,162,400	$2,940,000	$804,000	$11,511,000	$8,453,000
of buildings, per sq ft	$8.00	$8.50	$7.78*	$8.625*	$15.00*	$5.00*	$4.85*	$7.48*	$10.80*	$15.00	$12.00*	$12.43	$10.43
per cu ft	$0.52	$1.00	$0.55	$0.784	......	......	......	$0.65	$0.91	......	......	$0.73	$0.65
per lineal front ft	$1,110	$833	$659	$1,137	$2,500	......	......	$762	$1,292	$2,333	$2,297	$1,471	$1,076
of sidewalks, per sq ft	$0.40	......	$0.32	$0.50	......	......	......	$0.45	$0.48	$0.45	......	$0.55	$0.55
of parking area, per sq ft	$0.25	......	$0.278[8]	$0.40	......	......	......	$0.25	$0.22	$0.33	......	$0.53	$0.55
Size: Number of Stores	......	......	20	20	......	30	81	17	32	......	10	......	......
site, acres	13.5	8	34.5	12	33	40	32	4.5	10.6	20	1.5	55	54
floor area, incl basements, sq ft	170,000	42,000	127,000	120,000	400,000	200,000	310,000	59,320	107,800	196,000	66,000	840,000	707,000
sales area, sq ft	125,000	32,000	100,000	108,000	325,000	......	......	31,640	......	156,000	33,000	503,000	425,000
storage & service, sq ft	45,000	10,000	27,000	12,000	75,000	......	......	27,680	......	40,000	33,000	337,000	282,000
store fronts, lin ft	1,216	600	1,500	910	2,400	......	......	580	900	1,200	350	7,100	6,850
enclosed space, cu ft	2,632,300	500,000	1,790,900	1,320,588	......	......	......	687,600	1,293,600	......	......	14,280,000	11,312,000
sidewalks, sq ft	13,360	8,000	20,000	3,500	......	......	......	9,430	14,500	12,000	3,500	180,000	124,800
parking area, sq ft	900,000	180,000	450,000	450,000	......	20 acre	......	......	......	......	......	1,792,000	1,856,000
number of stalls or cars	1,500	450	1,200	1,500	2,365	2,000	1,500	535	990	2,000	200	5,120	4,303
Height, % of floor area in													
basements, %	35%	0	18%	✓	✓	0	0	20%	0	30%	50%	37%	33%
1-story buildings, %	65%	......	79%	✓	✓	100%	0	80%	100%	70%	50%	0	2%
2-story buildings, %	0	......	3%	✓	[13]	0	10	0	0	......	......	47%	41%
multi-story buildings, %	0	......	0	......	......	0	0	0	0	......	......	16%	24%
Type of Construction	CB & Br, PC[7]	S, CB	CB & Br, S, PC	CB & Br, S, PC	PC, Br or Mr	Brick	......	CB, PC[14]	CB, PC[14]	PC, S, W	S, PC	S, PC	CB, PC, W[16]
Special features													
covered arcades or sidewalks	......	✓10-ft	✓	✓	✓	✓	......	✓	✓	......	......	✓	✓
enclosed arcades	......	......	......	......	......	......	......	......	✓	......	......	✓	✓
air conditioning	65%	✓	100%	50%	✓	......	✓	✓	✓	✓	✓	✓	......
escalators, how many	2	......	......	......	2	......	......	......	......	......	......	8	5
elevators, how many	......	......	1	......	4	......	......	1 & 2DW	......	......	......	10	6
delivery truck access separated from customer access	✓	✓	✓	✓	✓	......	✓	......	✓	✓	✓	✓	✓
auditorium	......	......	......	......	......	......	......	......	......	......	......	✓	✓
theater	......	......	......	......	✓	......	......	......	......	......	......	......	✓
office building	10 doctors'	......	✓	......	✓	......	......	......	......	......	......	......	......
special landscaping	125 trees	......	✓	✓	✓	......	✓	......	✓	✓	✓	✓	✓
other	......	......	[9]	......	......	......	......	......	......	......	......	[12]	[15]

*CB concrete block *S steel frame *PC poured concrete *TUC tilt-up concrete *Br brick *Mr marble *C customers *E employees ** incl site work

[1] decorative sidewalks in central mall, other 3" sidewalks $0.20/sf [2] with rustic overlay [3] net, no extras incl [4] incl extras [5] wood frame, some post & beam [6] incl underpass to a store across busy street and site wrrk which account for $740,000 [7] bar joist, metal deck [8] incl grading [9] hollow metal doors & frames, firewalls every 100 ft, accoustical ceilings 95% [10] perimeter of building [11] also lannon stone facing [12] medical center & 24-lane bowling alley [13] construction ample for future 2nd floor [14] steel joists and beams [15] medical center [16] frames & roofs [17] includes arcades [18] elevated

Prestressing Expands at Competitive Prices

Challenged on almost every project by long-established structural materials, prestressed concrete is being adopted at an accelerating rate. Reports indicate tendon sales are more than doubling each year. Yet, many times during the past year when prestressed concrete was used, it was selected only after an alternate design in which it was included was bid low.

Latest reports also confirm the trend to pretensioning previously reported in ENR (Feb. 17, p. 80). In pretensioned members, the tendons transfer prestress to the concrete by bond throughout their length.

The tendons are either individual wires or strands. Strands are growing in popularity because larger diameter units can be used—up to ⅜ in.—and still meet bond requirements. With the larger size tendons, the cost of applying a given prestressing force is less than with individual wires, which generally are limited to a diameter of about 0.2 in.

- **One type shows most gain**—Some idea of the remarkable growth in the use of prestressing may be gained from the fact that two years ago very little pretensioning was used. Now, about 80% of prestressing is being done by the pretensioning method while post-tensioning (prestress transferred through end anchorages) more than holds its own. Thus the increase in prestressing in the past two years exceeds 400%.

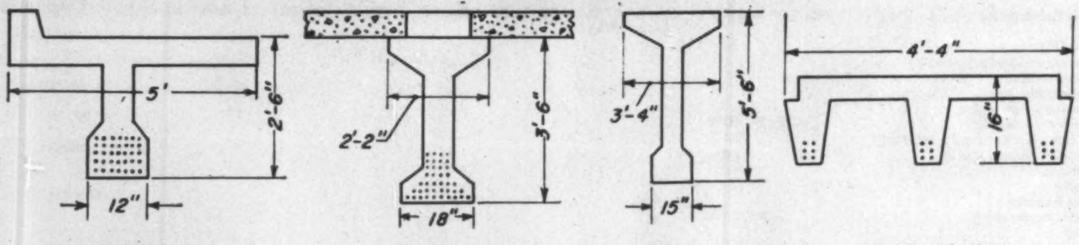
- **What does prestressing cost?**—Despite the experience gained in recent years, actual costs of prestressed concrete in place are hard to obtain. That is one important reason for the taking of bids on alternate designs with prestressed concrete and other materials. The difficulty is that the actual costs of prestressing for previous projects are usually buried in bid prices for an overall project or obscured by conditions peculiar to the project.

But thanks to Ross H. Bryan, consulting engineer, Nashville, Tenn., and Niels Thorsen, of the Freyssinet Co., New York City, some up-to-date cost data, mostly for pretensioned members, have been isolated. These are presented in the accompanying tables.

H. Kent Preston, of John A. Roebling's Sons Corp., Trenton, N. J., compiled the data in the table on costs of post-tensioning tendons. These costs are not for any particular system of prestressing or project, but for the most economical type of tendon for the given length; they are the prices that might be expected in competitive bidding open to all prestressing methods now in common use.

Included are material costs, freight charges and costs of placing, tensioning and grouting—plus 20% for contractor's overhead and profit. Costs in the table are based on jobs with 50 tons or more of wire or strand. A smaller project, requiring, say, 10 tons, might run 10% higher. The figures given are for tendons capable of ap-

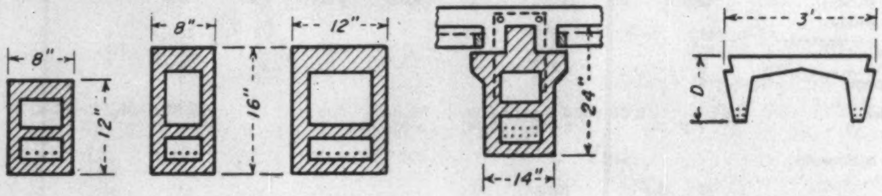
Cost of Simple-Span Pretensioned Members with Deflected Strands†



Where used	**Bridge**	**Bridge**	**Roof***	**Bridge deck**
Span, feet	82	84½	100	35
No. of ⅜-in. strands	28	40	24	20
Cost per lineal foot, f.o.b. plant	$25.00	$14.00	$30.00	$8.67
Delivery & erection, per lineal foot	$10.00 (40 mi.)	$3.50 (5 mi.)	$18.00 (150 mi.)	$1.08 (5 mi.)

†Designed by Ross H. Bryan, fabricated by T. L. Herbert & Sons, Nashville, Tenn. *Fabricated in three sections and post-tensioned on the site with five cables, each with twelve 0.276-in. wires.

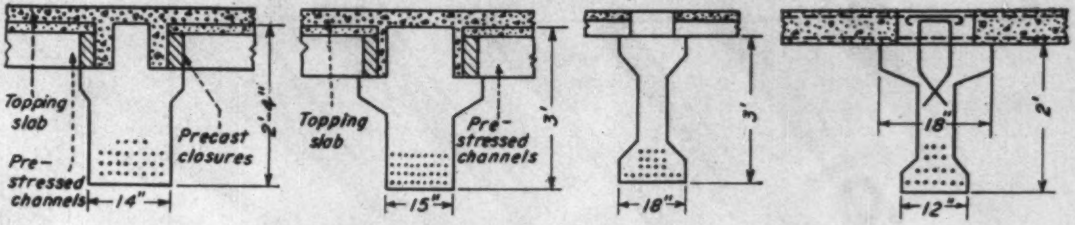
Cost of Prestressed Block Beams and Roof Channels†



Span, feet	20	25	20	25	22	26	35	45	50
Cross section, inches	8x12	8x16	12x16	14x24	6x36	8x36	10x36	12x36	14x36
No. of ⅜-in. strands.	4	6	8	10					
Cost per lineal foot, f.o.b. plant	$1.30	$1.70	$2.50	$4.50	$1.80	$1.95	$2.16	$2.37	$2.55
Delivery & erection, per lineal foot	$0.15	$0.20	$0.25	$0.50	$0.12 to $0.18				

†Designed by Ross H. Bryan, fabricated by Nashville Breeko Block Co., Nashville, Tenn.

Cost of Continuous Pretensioned Beams with Deflected Strands†



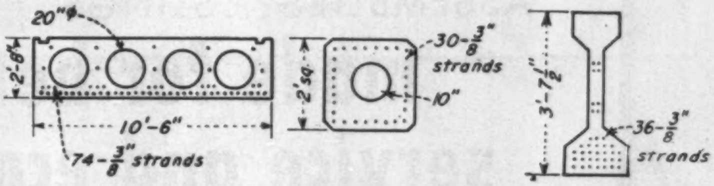
Span, feet	32	40	62*	50
Cross section, inches	14x28	15x36	18x36	18x24
No. of ⅜-in. strands.	28	36	20	18
Cost per lineal foot, f.o.b. plant	$11.00	$15.00	$13.00	$10.00
Delivery & erection, per lineal foot....	$0.50	$1.00	$1.50	$0.50

†Designed by Ross H. Bryan, fabricated by T. L. Herbert & Sons, Nashville, Tenn. *Part of a rigid frame.

Cost per 10-Kip Stress for Post-Tensioning Tendons

Length in feet	Total cost	Cost per ft.
25	$ 5.55	$0.222
50	8.40	0.168
75	10.80	0.144
100	13.10	0.131
150	18.90	0.126
200	24.00	0.120

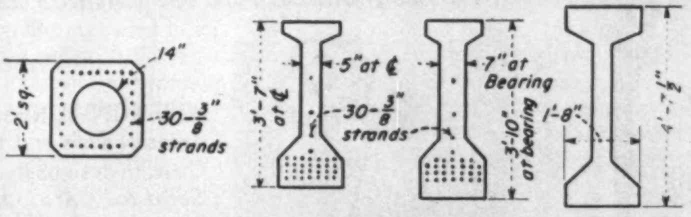
Cost of Prestressed Concrete for Pelican Islands Bridge† (Galveston, Tex.)



How used	Railroad slabs	Pile	Pretensioned stringers
Span feet	25	*	50
Cost per lineal foot, in place	$70.08	$12.10	$12.18

†Designed by Parsons, Brinckerhoff, Hall & Macdonald, fabricated by Whittle Construction Co., Dallas, Tex. *Total — 61,480 ft.

Cost of Prestressed Concrete for Hampton Roads Bridge†



How used	Piles	Pretensioned girders	Post-tensioned girders**
Span feet	73*	50	80
Cost per lineal foot, in place	$7.50	$8.28	$12.50

†Designed by Parsons, Brinckerhoff, Hall & Macdonald; fabricated by Merritt, Chapman & Scott; prestressing yard designed by Freyssinet Co. and Precrete, Inc. *Estimated average length; total, 43,000 ft. **Subsequently dropped from project.

plying a 10,000-lb prestressing force after all losses due to shrinkage and creep have taken place. To obtain costs for other prestressing forces, multiply figures in the table by one-tenth the actual force in kips.

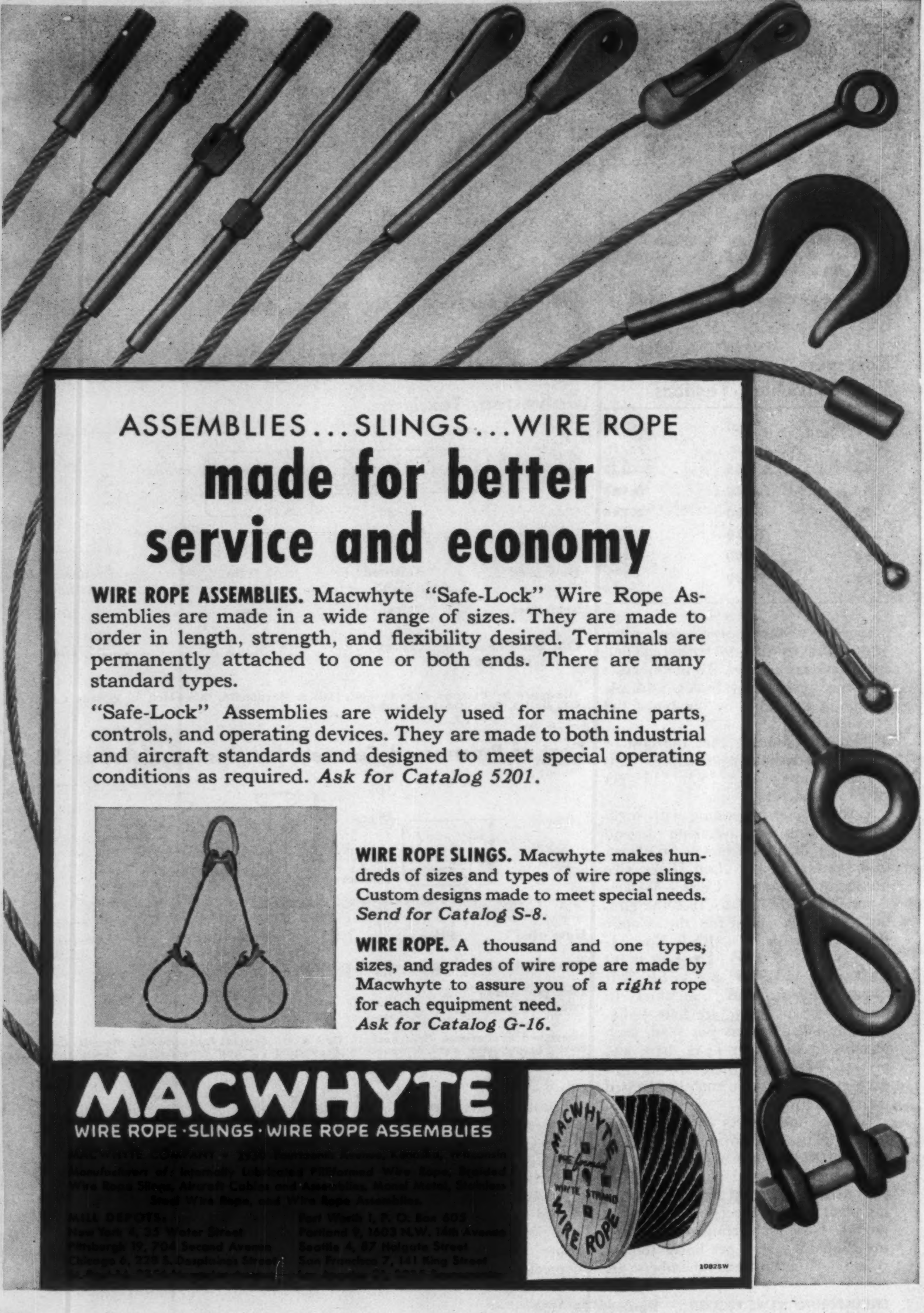
Thorsen estimates that the cost of most post-tensioned structures falls within the range of $125 to $135 per cu yd of concrete.

Costs of post-tensioning with high-strength bars are averaging around $0.25 per lb, plus labor at $0.05 per lb, according to J. Nelson Hicks, vice president, Stressteel Corp., Wilkes-Barre, Pa. He estimates that the girders and deck slabs for the Gandy Bridge at Tampa, Fla. (ENR Nov. 11, 1954, p. 26), cost $3.62 per sq ft for 48-ft spans and $6.95 per sq for 72-ft spans. Deck slabs are 7 in. thick. In the 48-ft spans, there are four 40-in.-deep, I-shaped girders per span, each prestressed with four 1⅛-in. bars; and in the 72-ft spans, there are six 4-ft-deep girders per span, each prestressed with six 1⅛-in. bars.

Current mill prices for the strand used for the pretensioned members listed in the accompanying tables are in the neighborhood of 20 cents per pound. Freight from mill to fabricating plant seldom exceeds 1¼ cents per pound. Cost for placing and tensioning is about ½ cent per linear foot of strand. When several members are fabricated simultaneously, an added allowance of about 5% is generally necessary for the extra distance between members in the casting bed and at anchorages and jacking points.

In estimating the cost of pretensioned members, contractor's overhead and profit also must be added to the above costs, plus an allowance for depreciation of plant. Preston estimates that the selling price of pretensioned members usually ranges between $70 and $80 per cu yd.

Nearly all pretensioning plants are producing members with a minimum 28-day strength of 5,000 psi. The ⅜-in. strands used have an ultimate strength of 20,000 lb; they are tensioned to a maximum of 14,000 lb, the design load being 11,200 lb.



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Large-Scale Experimental Atomic Power Plants in U. S.

Client & Location	Type	Designer & Builder	Estimated Completion Data	Output Elec. KW	Estimated Cost	Unit Cost Per Installed KW
Duquesne Light Co. and AEC Shippingport, Pa.	Pressurized water	Westinghouse Elec. Corp. Stone & Webster	1957	60,000(1)	$85 million(1)	$1400(1)
Detroit Edison Group Monroe, Mich	Fast breeder	....	1959	100,000	$54 million(2)	$540(2)
Nuclear Power Group (Commonwealth Edison Co.) near Joliet, Ill.	Dual-cycle boiling water	General Electric Co. Bechtel Corp.	1960	180,000	$45 million	$250
Consolidated Edison Co. near Peekskill, N. Y.	Pressurized water	Babcock & Wilcox	1959	236,000(3)	$55 million	$233
Yankee Atomic Electric Power Co., Rowe, Mass.	Pressurized water	Monsanto Chemical Co. Fluor Corp.	1958	100,000	$25 million	$250
Consumers Public Power District, Columbus, Neb.	Sodium graphite	North American Aviation, Inc.	1959	75,000	$20 million	$267
Pennsylvania Power & Light Co.	Homogeneous breeder	Westinghouse	1962	150,000	....	....

(1) Shippingport's output may reach 100,000 KW. This would reduce installation cost per KW to as low as $850. Furthermore, the amount of investment in research and development is very high, making comparison between this and costs of traditional plants almost meaningless.

(2) Detroit Edison's reactor costs also include huge outlays for research and development of the fast breeder, an advanced design.

(3) Of this, 140,000 KW comes from the reactor and 96,000 KW from an oil-fired superheater.

Atomic Power Plants—

Costs a Long Way From Competitive

Atomic power in the U. S. is starting to move this year from small-scale experimental reactors toward the full-scale developmental stage. Construction has begun on the first big power reactor—the 60,000-to-100,000 KW plant being built for Duquesne Light Co. and the Atomic Energy Commission at Shippingport, Pa.

Though a large-scale plant, Shippingport is still very much of an experiment. Its cost is estimated at $85 million, of which about $38 million is for the reactor, about $10 million for the generating section, and the rest for research and development. However, these figures cannot be considered as firm. The principals involved point out that one of the main reasons they are building the reactor is to provide a firm basis for estimating costs.

• **Many factors**—Philip A. Fleger, Duquesne's board chairman, recently had this to say about his atomic baby:

> "In developmental plants such as Shippingport, construction costs will reflect the cost of many things which have been embodied in the plant for research and development. The relatively high cost of components manufactured on a tailor-made or non-tooled basis will also be a distorting factor. True construction cost values will be further obscured by subsidies from firms desiring to be associated with the projects for the purpose of gaining knowledge and prestige. Initial operating expenses will be inflated by manpower costs which will reflect lack of experience, insufficient knowledge of safety requirements, and test work . . .
>
> Therefore the actual cost of electricity produced by developmental plants such as Shippingport will be of no significance whatsoever. On the other hand, with the knowledge gained from the construction and operation of these plants it will be possible to estimate the cost of constructing and operating plants of the same type on a non-developmental basis . . . These estimates will present some difficult questions, especially as to the life of various elements in the reactor portion of the plant and the proper amount to be set aside each year for their depreciation. But reasonable accuracy should be attainable after several years' operating experience. Any estimates made prior to this will have to be based upon many arbitrary assumptions and will be in the nature of guesswork."

The Shippingport plant is not scheduled to start test operations until 1957, and Fleger says it's a tight schedule. That gives you an idea of how long it will take to get firm data on A-plant construction costs in this country. The cost estimates for other projected plants in the table (above) should be read with this important qualification in mind.

But as you study the table, you will see a rapid decrease in estimated costs of construction per installed KW, for U. S. projects proposed since Shippingport was announced early last year. These estimates indicate that, on paper at least, rapid advances are being made in nuclear technology.

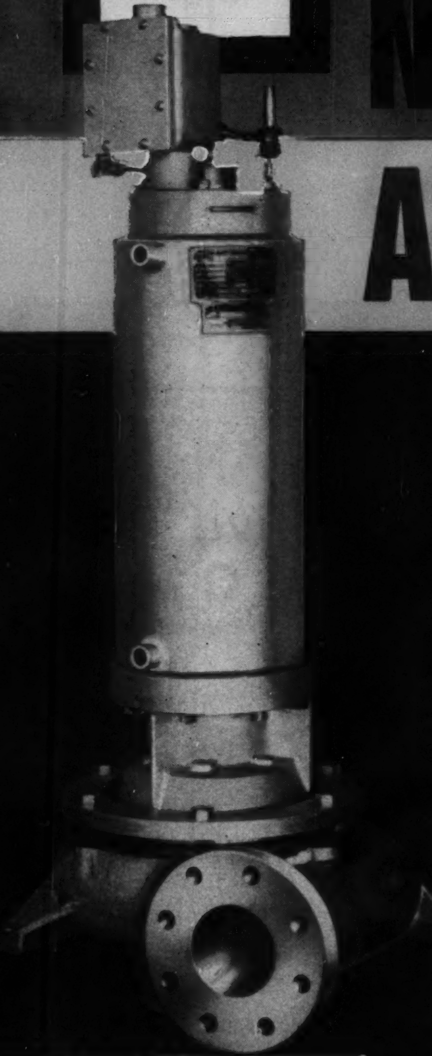
• **Foreigners first**—Incidentally, Shippingport will not be the first big A-plant. The British have the first of a whole string of central station plants scheduled to go into operation next year. And the Russians claim they will also have one going in 1956.

However, though the Americans may not be the first in the field, they are certainly going to offer variety. In August, AEC approved proposals of two private groups to go ahead with large-scale reactors. One is the 180,000-KW plant that the Nuclear Power Group, headed by Commonwealth Edison Co. of Chicago and including Bechtel Corp. of San Francisco, will build in the Chicago area. This one will be owned by Commonwealth Edison and partly financed by the others in return for experience.

The other project is a 100,000-KW plant to be built near Detroit by a group of 23 companies headed by Detroit Edison Co. The members will own their plant jointly, with Detroit

BJ

PUMPS FOR NUCLEAR APPLICATIONS



FIVE BASIC APPROACHES to nuclear fluid handling have been developed. Four are "zero leakage" types: (1) the canned motor pump; (2) the submersible motor pump; (3) the gas filled motor pump; and (4) the oil filled motor pump. These four types employ special electric drive motors close-coupled to the pump with the entire unit hermetically-sealed. The fifth approach, a "controlled leakage" type, uses a mechanical seal to confine leakage along a shaft driven by standard electric, gasoline or diesel motor or steam turbine.

Byron Jackson Co.'s Nuclear Section offers unusual advantages in all nuclear pumping approaches. Not only is Byron Jackson an experienced producer of all nuclear pump types, but BJ is the only company which designs and manufactures all three major elements: pumps, special pump motors, and high precision mechanical seals. Since 1872 BJ has held leadership in engineered pumps. Since 1936 BJ has pioneered in specialized pump motor design. Since 1940, BJ has set the pace in mechanical seal development. BJ originated two of the parent nuclear pump designs . . . the mercury-sealed submersible motor pump in 1936, "grandfather" of canned nuclear pumps . . . and the stuffingboxless pump developed in 1945, "father" of the basic canned pump design.

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Pacemaker in Nuclear Pumps

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Edison buying the steam. At the time of writing, action was still pending on an application by Consolidated Edison Co. of New York for an even bigger plant (see table) near Peekskill, N. Y., to be financed by the owner. Recently Pennsylvania Power & Light Co. applied for a privately-financed plant, to produce "at least 150,000 KW."

The experience at Shippingport will help to firm up cost estimates for other reactors, though all but the Peekskill project are of different types.

What are these various types of reactors, and how do they differ from each other? To answer that, we must review the general engineering problems of any power reactor.

• General problems—In the first place, as many as possible of the neutrons released by fission must be absorbed by neighboring fuel atoms, to insure a chain reaction and conserve this expensive fuel. Some reactors use "fast" neutrons, emitted at a speed of 10,000 miles per second. Others employ a slowing-down material, called a "moderator." In addition, the structural materials that are used in the reactor must have a low capacity for absorbing neutrons.

Next, the designer must keep in mind that constant neutron bombardment of the structural materials causes changes in their properties. And of course the whole reactor structure must be surrounded by a shield that protects the operators from radiation. Replacements of parts inside the reactor must be done by remote control.

Energy (in the form of heat) having been produced, the next problem is to transfer it to steam in the turbogenerator. There are many different possible ways of doing this.

And there are two other problems which have to be solved before commercial A-power is possible: (1) How do you keep the reactor from getting so hot it melts, spouting radioactive material into the air? (2) At intervals, the fuel elements used in some reactors must be taken out to be reprocessed. This is a very expensive process. Can it be done economically or avoided altogether?

• Pressurized reactor—Here's how the Shippingport reactor is designed to solve these problems. This is a pressurized-water reactor. Water (kept under heavy pressure to prevent it from turning to steam though it is several times the normal boiling point) circulates around the fuel inside the reactor, acting as a moderator and absorbing heat. This pressurized water flows through a circuit between the reactor and the heat exchanger. Here, without passing on its radioactivity, it transfers heat to water in a separate circuit. This water, turned to steam, operates the turbogenerator.

There are four other major reactor possibilities, and all but one of them has a very different method of transferring the heat of nuclear fission into electric power. Commonwealth Edison's plant near Chicago—to be called the Dresden Station—is a dual-cycle boiling water reactor. This needs no heat exchanger. It provides a circuit where radioactive steam comes directly out of the reactor to operate the turbogenerator, and also a secondary circuit that provides boiling water which "flashes" into steam in case of a sudden increase in demand for power.

• Fast breeder—A very different approach is the fast-breeder reactor, to be used by the Detroit Edison Group. This would create more fuel than it consumes. That is, the neutrons produced by fission of U-235 atoms would convert the U-238 atoms which are also present in uranium to plutonium (itself a fine atomic fuel). And there would be more plutonium atoms produced than U-235 and plutonium atoms consumed. In this reactor, the heat energy produced by the fission of U-235 atoms would be carried to the heat exchanger by liquid sodium, a metal. Molten metal would pass through the water-filled heat exchanger in a closed circuit, turning water into steam for the turbogenerator. The plutonium atoms produced would be removed periodically from the reactor for use as fuel or for military purposes.

Still another type of reactor—in the opinion of many experts the most promising of all—is the homogeneous breeder. This is the type Foster Wheeler Corp. believes it can install for $210 per kw. This eliminates the expensive periodic replacement of the fuel element, substituting a solution of uranium in heavy water which can be continuously reprocessed by a chemical plant adjoining the reactor.

• Homogeneous breeder—Inside the reactor, the uranium solution flows within a core that is surrounded by a slurry of thorium and heavy water. This slurry does two jobs: (1) It absorbs heat from the reactor core and passes through a heat exchanger where the heat becomes steam for the turbogenerator. (2) The slurry acts as a "blanket", producing more fuel in the form of U-233, which is continuously drawn off by another adjoining chemical plant.

This is not all. The uranium solution in the reactor core, which is radiating neutrons into its surrounding blanket, also passes in a closed circuit through its own heat exchanger, producing more steam.

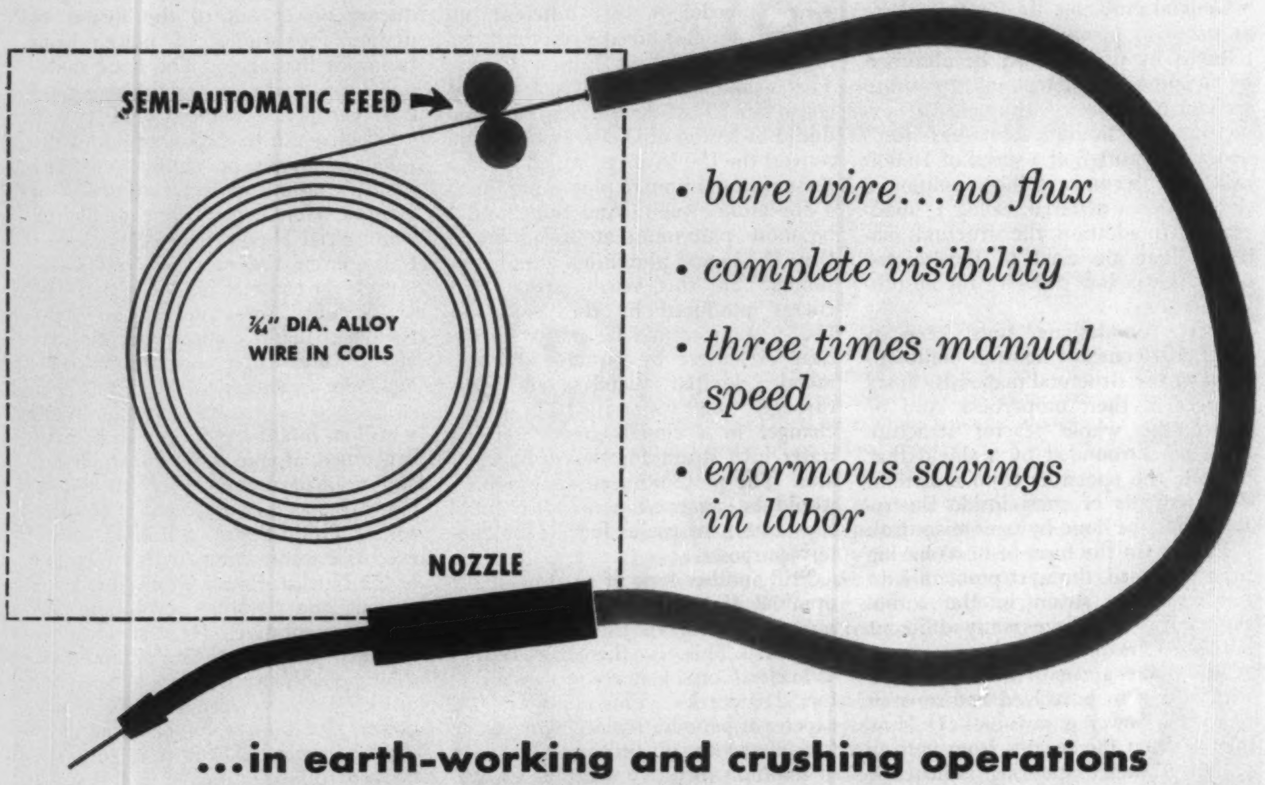
• 80 ways—These are the main types of reactors now under construction. More advanced types are being studied. Last year, AEC noted that there are "perhaps 80 or more" ways of converting atomic energy into electric power. By next year's Cost Issue, ENR's table of nuclear central stations may show lower estimates per installed KW. It may not be until 1957, however, that ENR will be able to provide detailed unit costs based on actual experience.

By that time, it is possible that all A-plants then under construction will be already obsolete, as new types are developed. And within a few years, experiments might shift from producing power out of the fission of uranium to studies of power from fusion of hydrogen. The basic material—heavy hydrogen—might be a good deal cheaper. There would be no radioactive ash to dispose of. And the shielding might be lighter. At last month's atomic power conference in Geneva, some experts were predicting commercial H-power by 1975. As of today, even the most optimistic do not expect commercial A-power in the U. S. until sometime after 1962—though it might come earlier in parts of the world where conventional fuels are more expensive.

• Still an infant—As far as the U. S. is concerned, atomic power for industrial and residential use is still in its infancy. It has serious obstacles to overcome. Philip Sporn, a leading utility executive whose company is a member of the Nuclear Power Group, has tried to put the "atomic revolution" in proper perspective. He is sceptical of the idea "that from Shippingport we shall be able to leap by a series of quick jumps to economical atomic power . . . I do not mean that it is wholly impossible, but it is going to be very difficult, and it will take a great deal of engineering development to approach it."

Meanwhile, as atomic power gradually gets more economical, conventional methods of power generation are getting more efficient too. As Sporn has expressed it, the developers of the atom "are shooting at a moving target." Sporn believes that the great majority of the U. S. plants built in the next 15 years will still use conventional methods. Right now, installed generating capacity is about 100,000,000 KW. "By 1970, when our overall national requirements for electric power will be around 275,000,000 KW, I would not expect the proportion of nuclear power to be as much as 10,000,000 KW."

SEMI-AUTOMATIC with the NEW Alloy Tubular



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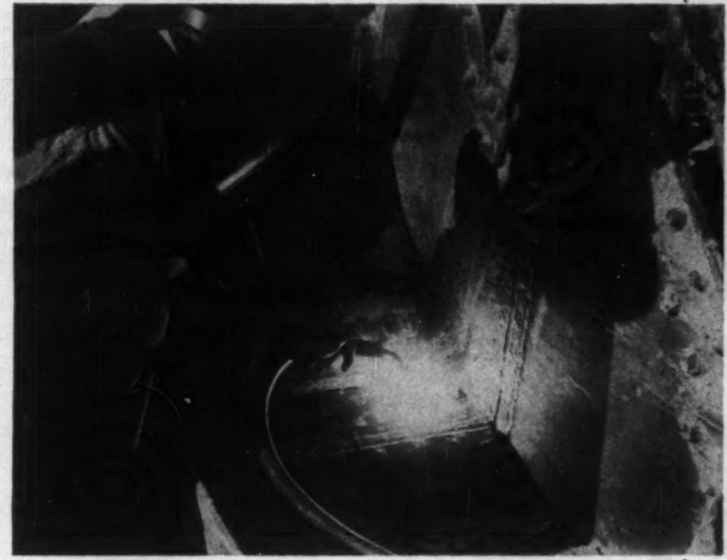

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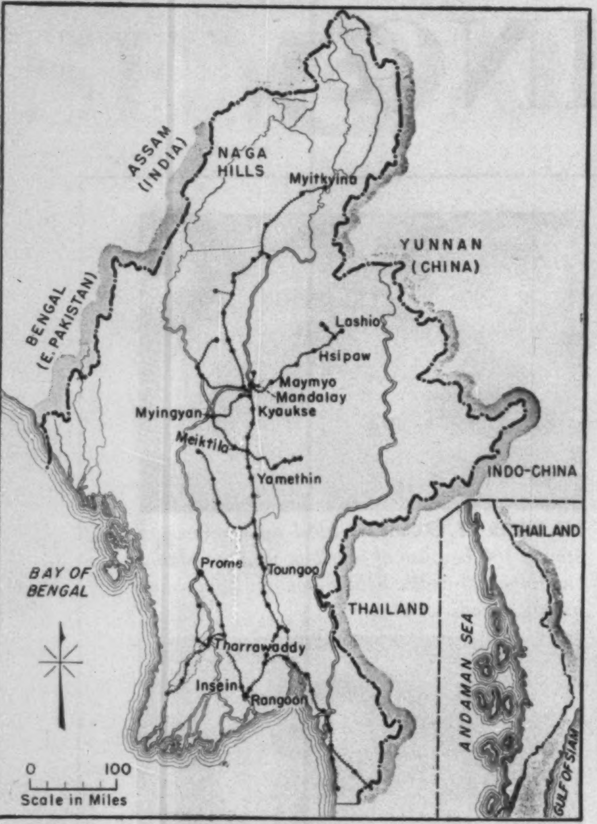
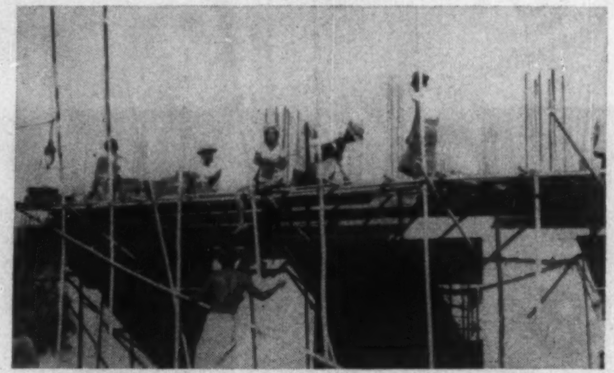


BURMA'S RIVER AND RAIL transport system.

STOCKPILING at the site in Burma.



MOVING MATERIALS to job by aerial route.

Construction Prices Point Up Engineering Problems

High on the list of problems that American engineers run into when they work on development programs in other countries are scarcity of basic planning data, inadequate transportation facilities, differences in construction materials and construction methods. The minor problems include differences in units of measure and in the monetary units for judging prices and costs. Many of these are illustrated in the prices shown here.

Burma's Pyidawtha program (long-range program for economic and social development) was drawn up for the Burmese government and is being directed by Tippetts-Abbett-McCarthy-Stratton, consulting engineers of New York. Ben Robinson, assistant to their chief planning engineer in Rangoon has assembled the materials prices and wage rates shown here and in addition the unit prices on the British-built bank building in Rangoon.

Since the Pyidawtha program has stepped up construction activity Burma's material and labor prices have been rising and continue to do so.

Generally speaking, local skilled labor is scarce and has to be imported for sizable projects. Rates and "fringe" benefits for workers from India are shown. Unskilled labor is available except during planting, cultivating and harvesting seasons.

But the big problem is the high cost of transportation—by boat, rail, truck, ox-cart. The cost of getting a tractor from the port of entry to where it is needed can be as great as the original purchase price. The cost of steel in the Naga Hills area is four or five times its cost at Rangoon with transport to Mandalay responsible for three quarters of this differential. Access by rail or river is limited to the central area.

Good aggregates for concrete are scarce. Broken or crushed brick and shingle gravel or chips predominate. The latter is a flat stone that breaks up in planes. Sand is of uniform size without the gradations that reduce interstices.

Laterite a red, iron-bearing stone, not rich enough to qualify as ore, makes good self-binding road metal.

Local brick is of poor quality and low cost, \$20/M. When used in walls a coat of ½-in. to ¾-in. plaster or stucco is applied over it, then this is whitewashed. Both white and color washes are widely used but white is on the long side of a 95-5 use ratio.

Plastering is still a fine art in Burma. Note the moulded, projected and raised plastering in the unit prices shown for the new Burmese National Bank Building.

Steel prices are rising. Reinforcing steel has recently gone up £3/ton from Japan and £5/ton from Belgium. All steel is imported.

Jungle wood includes bamboo which is widely used. Teak is the most popular wood for doors, windows and interior finishes. It takes six years to process from the time the tree is ringed until it is delivered to the mill. This time is increasing and prices are rising due to a "tax" imposed by insurgents to permit logs to pass through the river. An active program is underway to develop and popularize other of the many excellent woods available in Burma.

In the prices that follow differences to look for include these pricing units: 100 sq. ft., 100 cu. ft, long tons, the running foot where lineal foot is used here, the sadram (10′x10′x1′). Burma's Department of Public Works defines a concrete mix as 1:2:4 but the British builders call it 4:2:1. The Department of Public Works is doing an excellent job of developing basic construction cost data for various classes of work in place, for dismantling and for reclaiming materials.

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OWNER AND BUILDER: *Tishman Realty and Construction Co., Inc.*
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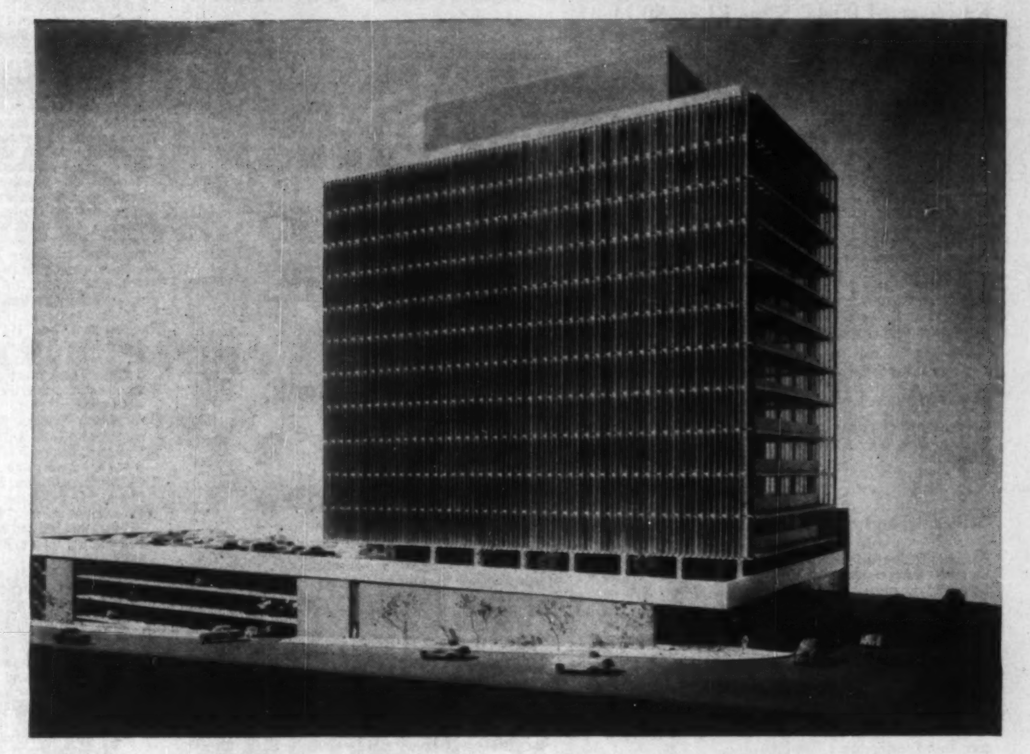
ARCHITECT: *Victor Gruen, A.I.A., Los Angeles, New York and Detroit*



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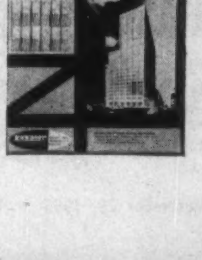

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ARCHITECTURAL PRODUCTS DIVISION

Prices are shown here in Burma's new kyat (K), pronounced chaht, which replaced the rupee in 1954. With 100 pyas to the kyat, it is easy for Americans to use. Officially K4.76 = $1.00 U. S. or Kl = $0.21.

Wage Schedules, Burma

Actual costs, local labor, December, 1954

Skill	K/day	$/day	$/hr
Common labor	2.50	0.53	0.07
Concrete laborers, Bricklayers, Carpenters	6.00	1.26	0.16
Plumbers, Electricians	8.00	1.68	0.21
Power equip. operators & maint. men	15.00	3.15	0.40
Steel workers	12.00	2.52	0.32
Metal lathers	8.00	1.68	0.21
Welders and blacksmiths	8.00	1.68	0.21
Light equipment operators	6.00	1.26	0.16

Foremen, (monthly employees, received approximately 1–1/2 times the daily rate of the skilled labor they supervised Burmese nationals are paid for 14 holidays, 10 days casual leave, 30 days sick leave and 26 Sundays)

Common labor, foreman	5.00	1.05	0.13
Concrete, Bricklayer, Carpenter	9.00	1.89	0.24
Electrician	12.00	2.52	0.32
Steel worker	18.00	3.78	0.58
Metal lather	12.00	2.52	0.32

Skilled labor from India

	K/mo*	$/mo
Carpenters, Electricians, Steel workers	321.00	67.50
Carpenters apprentices	213.00	44.80
Foremen, carpenter	375.00	79.00

* rates are pro-rated to incl 1 month salary per year in lieu of vacation, plus K600 for round trip fare from India—monthly rate is base rate × 13/12 + 600/12

Foremen who are Indian nationals, monthly employees, are paid for 14 holidays, 10 days casual leave, 30 days sick leave, 30 days vacation, 52 Sundays

Labor rates for contract work—July 30, 1955, per head per day

Carpenters, plasterers, steel benders, structural steel men		K10/-
Bricklayers, concrete masons		K9/-
Coolies	male	K4/-
	female	K3/-
Foremen		K500–600/month

Materials Prices, Burma

December, 1954

Material	Burma Unit	Unit Cost	U S Unit	Unit Cost
Sand, (100#/cf*) 10-mi haul	100cf	K 30	t	1.25
asd		K18–25		
Crushed stone, ⅛" to ½"	100cf	K280	t	10.60
(3,000#/cy*) ½" to 1"		K260		9.83
1" to 2"		K210		7.94
River gravel (2,800#/cy*)	100cf	K135	t	5.48
Laterite (100#/cf*)	100cf	K 50	t	2.10
Cement, shipload lots, barging not incl....asd	L t	K170	t	31.90
Struct steel, contract price	cwt	K 40	cwt	7.46
Reinf steel, contract price	cwt	K 50	cwt	[1]9.37
Bitumen, small quantities	L t	K407	t	76.40
shipload lots	L t	K240	t	45.10
Struct timber, Jungle	Mbm[2]	K350	Mbm	73.60
Pyinkado		K525		110.40
Teak		K750		157.80
Concrete drain pipe, 18"	lf	K 25	lf	5.25
24"		K 30		6.30
36"		K 40		8.40
48"		K 50		10.50

Contract prices, in place

Concrete, Cl A, 1:2:4	cy	K150	cy	31.50
Cl B, 1:3:6		K 95		20.00
Cl C, 1:4:7		K 75		15.76
Plaster, 3 coats	sy	K4.50	sy	0.95
Welding, 3-pass	lf	K 3	lf	0.63
Premix, 2" carpet	sy	K 15	sy	3.15

* assumed   *[1] $6.03, cost from Japan   *[2] all structural timber is bought by the Long ton, arbitrary assumption here, despite specific gravity, is that 1 Lt = 600 bf

Material Prices for Contract Work, 7/30/55

Material	Unit	Price
Struct lumber, Junglewood scantlings	t of 50cf	K280/-
boards		K290/-
Teak for doors and windows		K850/-
Steel, reinf, M S round bars	t	K1,100/-
struct, RSJ and angles	t	K1,200/-
Brick, local	M	K 87/-
Glass, imported, 24-oz	sf	K1.50
Sand 10' x 10' x 1'	sadram	K 28/-
Gravel, river shingles	sadram	K120/-
Granite stones, stone chippings	sadram	K225/-
Road metal	sadram	K200/-
Granite block, road base, 6" to 9"	sadram	K175/-
Cement	t	K180/-

Unit Costs of Burmese National Bank, 1954

Item	Unit	Rate in Kyats
Clear site, incl remov exist floor & wall	ls	1,500
Excav, earth cols & wall foundations, incl part backfill, watering, ramming, temp timbering, bailing	Ccf	7.00
Cement conc, 6:3:1 with 1½" brick aggr to foundation	Ccf	245.00
to col base, incl all temp forms	Ccf	260.00
Brickwork, 4:1 cmt mortar, Thamaing brick, to foundation up to plinth	Ccf	225.00
Cement conc, 1½", 4:2:1, fine shingle aggr & 5% Pudlo laid for dampproof course	sf	1.00
Sand fill to floor, 6" layers, watered & rammed to received conc floor	Ccf	37.00
Brickwork, 1st class, 4:1 cmt mortar, Thamaing brick, all quoins, perpends, English bond, joints raked min ¼" deep to	Ccf	235.00
same in 6:1:1 composite mortar 1st to 2nd fl	Ccf	230.00
same, 2nd to 3rd floor level	Ccf	242.00
same from 3rd fl to roof and par walls	Ccf	260.00
Partition wall, 4½" reinf brick, 1st class Thamaing brick, 4:1 cmt mortar reinf with Exmet every 4th course	Csf	125.00
Sub-floor, 4½", 6:3:1 cmt conc, 1" brick aggregate laid to ground floor	Csf	95.00
Ground floor, 1½", 4:2:1 cmt conc with fine shingle aggr laid in squares, trowel finish in 2:1 cement mortar	Csf	70.00
same, finish with Terrazzo, colour, desine, polish, complete	sf	5.50
Terrazzo ½" skirt 12" high to match floor, incl ¾" backing in 3:1 cmt mortar, polish	rf	6.50
Floor slab, reinf 4½" 4:2:1, shingle aggr reinf with BRC#9 incl tension strips, finish smooth with 2:1 cmt mortar, 1 operatn	Csf	312.00
Cement conc, 1½" shingle aggr 4:2:1 finish with Terrazzo to step incl forming nosing	sf	7.50
Cement plaster to ceiling, 3:1	Csf	45.00
Waterproofing to portico roof slab with 2 layers mastic & blinded with fine gravel	sf	1.25
Composite plaster to wall, ¾", 6:1:1	Csf	35.00
Encase RS beam 12" x 6" & 9" x 4" with brick in 3:1 cmt mortar incl BB lathing to bottom flange & plastered, complete	rf	2.75
Plastered moulded frieze, 4½" project 12" wide at 1st floor level, Xtra over plastr	rf	3.25
architrave, incl brick core, 9" x 4½"	rf	3.50
cap to cols, incl brick wall, 6" x 4½"	rf	3.00
base to cols, incl core, 3", 12" high	rf	5.00
Raised plaster, ½" in 6:1:1 at 1st fl level extra over ordinary plaster	Csf	38.00
Plaster parapet mould to portico parapet incl brick core	rf	3.00
Plastered projected moulded sill, 6" x 1½", to windows incl brick core	rf	2.00
frieze 4½" x 3" mould at roof	rf	2.50
parapet coping, 6" x 3"	rf	2.50
Provide in mortar & paint raised characters to read "The Burmese National Bank" in Burmese & Roman characters	ea	200.00
RCC lintel in brick aggregate ¾", 4:2:1 reinf with 1% MS rod	cf	6.50
RCC in shingle aggr 4:2:1 reinf with BRC#9 incl 4½" landing & 1½" fine shingle conc finish to tread with 1½" x ¼" projected nosing & 3:1 cmt plaster to riser & soffit of stair	sf	8.00
Reinf brick rail to staircase balustrade 3", 3'–6" high, plastered both sides, incl 6" x 1½" teak moulded handrail, incl all bends. Shellac polish to wood, 3 coats of colour wash to plaster	rf	11.75
Wood counter, 1st cl teak 3' x 3'–6" high, teak paneled front, utility drawers every 6' incl frames on brick wall 4½" wide, Terrazzo skirt, shellac polish	rf	95.00
WI rail 1½" high on top of counter ½" x ½" sq rod and 1½" horiz, 3 coats oil paint	rf	20.00
Brick rail, 4½" 3'–6" high, at Mezzanine incl 5" x 1½" teak moulded handrail, complete with plaster & polish	rf	10.00
Windows, metal front, incl 3 coats oil paint	sf	18.25
1½" teak, glazed, incl 4" x 3" teak frame complete with iron furniture & 18-oz plain glass	sf	7.00
Paneled door, teak 1½" incl 4" x 3" teak frame & iron furniture, full panel	sf	7.25
Teak panel & glazed partition, 1½" with necessary teak framing, collerox glass	sf	8.50
Teak panel & glazed swing door, 1½" collerox glass	sf	8.50
Steel plated windows, 1/16", 2" x 2" x ¼" L angle iron frames & 3 coats oil paint	sf	13.00
MS plate sliding door with angle iron frame & top & bottom roller, 3 coats oil paint	sf	13.50
Teak panel main door 2" incl 6" x 4" teak frame, 3 coats shellac polish	sf	15.00
WI collapsible door, ¾" MS channels, ¼" x 1/16" diagonal incl top & bottom runners & ball bearing rollers, 2 coats of aluminum paint	sf	7.00
WI ornamental grill ⅝" x ⅝" sq rod to front window at ground level, 2 coats aluminum paint, window guard	sf	14.00
MS rod ⅝" at 4" c/c with 2" x ¼" MS flat iron vertical to side under ground floor only incl 3 coats oil paint	sf	8.25
Asbestos sheet ceiling on & incl teak joist 5" x 2" at 4' c/c and 2" x 1½" cross @ 2' c/c incl 2" x ½" moulded cover strip incl 3 coats whitewash, oil paint to beading	Csf	166.00
Xtra over above ceiling to form teak ventilator 4' x 4'	ea	65.00
to form 2' x 2' manhole with trap door to ceiling	ea	20.00
Teak wood, 1st cl, wrought & fixed to purlin	cf	25.00
Teak fixed venetian to gable end 1½" incl frame with 3 coats oil paint	sf	8.00
Corrug asbestos sheet roof fixed to purlin incl drive screw, felt, limpet washers	Csf	132.00
Sheet ridging, 24 BWG, GI to shape & to fit corrug, fixed with drive screw, felt & limpet washers	rf	3.50
Eaves board, 10" x 1" teak, fixed to purlin with WI clamp	rf	2.25
Eaves gutter with GI 22 BWG sheet to shape, WI clamp at 4' c/c, 3 coats oil paint	rf	6.50
Box gutter, 22 BWG GI on & incl 5" x 2" bearer & 1" teak board fixed to slope, 2 coats of earth oil to timber work	rf	12.00
Flashing to wall above box gutter, 12" GI incl cutting chase & make good to brick work & plaster	rf	2.00
Lead flashing over hipend, 5 lb/sf	sf	6.00
Rain water pipe, 4" φ incl fittings, 3 coats of oil paint	rf	6.50
Steel, supply, fabricate, erect incl 1 coat paint before erection, 2 coats after	cwt	60.00
White wash to ceiling & beams with proper binder, 3 coats	Csf	4.00
Colour wash to internal wall with proper binder, 3 coats	Csf	5.00
Snowcem to external wall, 2 coats	Csf	16.00
Linseed oil to door & windows, 2 coats	Csf	10.00
Flag pole, 20' teak, with pully & rope, incl 3 coats oil paint	ea	285.00
Shellac polish to glazed & panel partitions, 3 coats	Csf	50.00

Strong Room

Earthwork in foundation incl part backfill	Ccf	7.00
RC conc 4:2:1 with stone chipping in:		
foundation reinf with 1" φ MS rod at 6" c/c both ways	cf	5.00
wall reinf with 2 rows of ¾" φ MS rod vert hooked to foundn reinf at 6" apart with ¼" φ MS rod as dist rod across, incl all shuttering	cf	9.25
roof slab, 9" with ¾" φ MS rod at 6" c/c ⅜" φ cross	sf	6.75
to floor, 6" reinf with ¼" φ MS rod at 6" apart both ways & furnished with 2:1 cement mortar in one operation	sf	3.50
Ventilator at top & bottom to wall	ea	20.00
Plaster to wall & ceiling, 3:1	Csf	40.00
Colour wash to wall & ceiling, 3 coats	Csf	5.00
Strong room door, provisional, 2½" anti-blow pipe door & gate, with grip frame & vestibule plates for 18" wall, watertight 2 keylocks ea on door & gate, clear opening 6'–3" high x 2'–7"	ps	9,200

Wide Range in Materials Costs Delivered at Site

July 1955 Prices		Cost in Kyats		By Districts	
Material	Unit	Min	Max	Minimum Cost	Maximum Cost
Sand	100 cf	K 8	K 40	Myingyan	Hsipaw, Lashio, Kutkai*
Stone, crushed	100 cf	K 35	K 300	Hsipaw, Lashio, Kutkai*	Rangoon-Hmawhi*
Gravel, river	100 cf	K 12	K 120	Yamethin, Toungoo, Meiktila	Tharrawaddy
Laterite	100 cf	K 25	K 70	Myitkyina, Kutkai*	Insein Dist incl Rangoon
Cement	t	K 224	K 700	Meiktila, Prome	Kunhina to Siam border
Steel, struct	t	K 650	K 2800	Rangoon-Insein Dist	Mandalay to Sagaing, Maymyo to Hsipaw & to Meiktila
Reinf steel	t	K 420	K 2520	Myitkyina	Myitkyina & Naga
Bitumen	t	K 312	K 930	Yamethin, Toungoo	Kunhina to Siam border
Conc, mix & plac	cf	K 1	K 18	6 Divs, incl Lashio	Naga Hills
Drain pipes, 18"	lf	K 10	K 23	Myitkyina	Prome
24"	lf	K 13	K 38	Mandalay to Meiktila, Hsipaw	Naga Hills
36"	lf	K 20	K 66	Insein	Naga Hills
48"	lf	K 32	K 96	Kyaukse	Naga Hills
Teak	cf	K 10	K 17	Moulmein,* Myitkyina	Meiktila, Thayetmyo*
Pyingkado	cf	K 6	K 16	Shwebo* to Tamu*	Mandalay, Maymyo, Moulmein*

* Not shown on map

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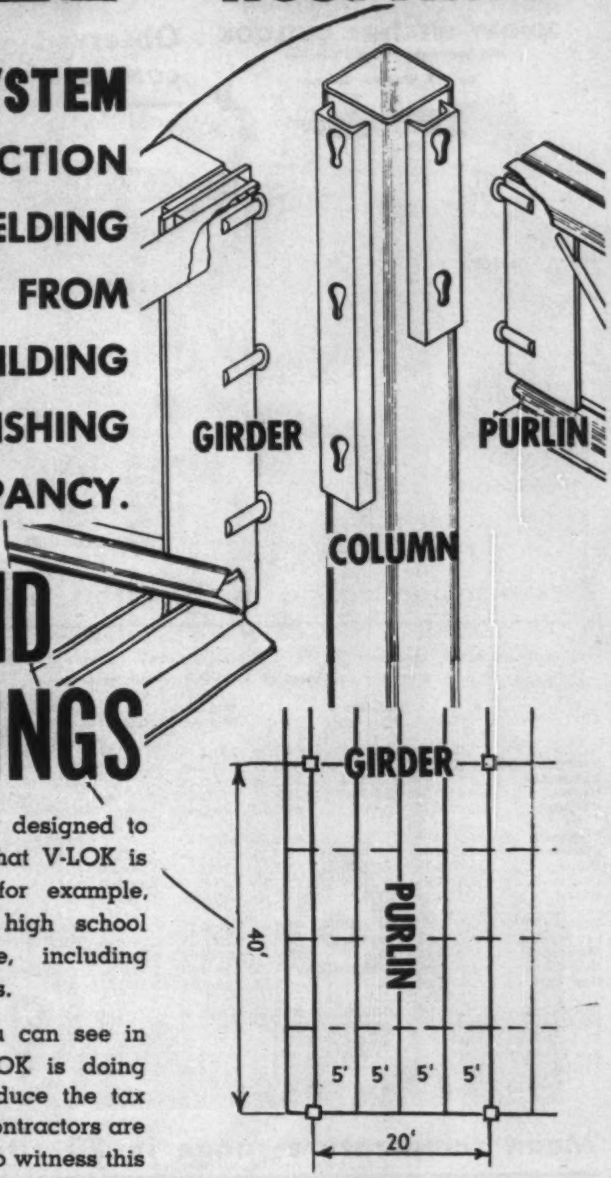
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COLUMN
GIRDER
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20'

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- METAL DECK
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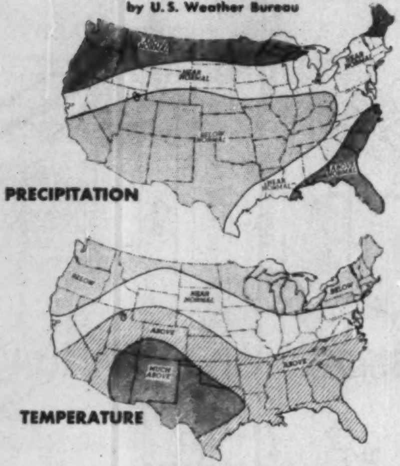
- STRUCTURALS

WEATHER

30-DAY WEATHER OUTLOOK

Mid-September to mid-October

by U.S. Weather Bureau



PRECIPITATION

TEMPERATURE

Observed weather in 20 cities, compared with normals

	Precipitation, inches				Temperature, degrees			
	Aug. 1955	Departure fr. normal	8 Mos. 1955	Departure fr. normal	Aug. 1955	Departure fr. normal	Av. daily maximum	Av. daily minimum
Atlanta	1.54	− 2.27	30.48	− 5.16	80.1	+1.5	89.6	70.6
Baltimore	18.35	+13.95	36.37	+ 6.50	78.1	+3.7	86.4	69.8
Birmingham	0.82	− 3.73	36.29	− 2.43	81.1	+2.0	91.9	70.2
Boston	17.09	+13.86	40.45	+14.33	74.5	+3.0	82.5	66.5
Chicago	5.35	+ 2.16	22.14	− 0.51	78.7	+6.0	88.7	68.7
Cincinnati	4.14	+ 0.76	32.38	+ 4.01	78.0	+3.2	88.9	67.0
Cleveland	3.82	+ 1.18	28.22	+ 6.64	76.1	+4.2	85.7	66.5
Dallas	1.56	− 0.27	18.02	− 5.97	84.4	−1.4	94.9	73.9
Denver	2.02	+ 0.67	8.69	− 1.59	73.7	+1.3	85.0	62.3
Detroit	3.75	+ 1.13	16.17	− 5.41	75.7	+4.4	85.2	66.2
Kansas City	3.27	− 0.62	24.13	− 0.73	80.9	+1.9	90.6	71.1
Los Angeles	0.05	+ 0.03	9.10	− 0.53	75.2	+2.3	85.8	64.6
Minneapolis	2.84	+ 0.05	15.61	− 2.31	76.1	+4.6	86.1	66.0
New Orleans	13.79	+ 7.38	51.41	+ 5.94	83.2	−0.2	89.9	76.4
New York	13.82	+ 9.48	28.49	− 0.67	77.2	+4.0	83.9	70.4
Philadelphia	9.70	+ 5.12	25.38	− 3.94	78.1	+4.1	86.5	69.7
Pittsburgh	8.17	+ 5.07	27.07	+ 0.90	76.7	+3.6	85.9	67.4
St Louis	2.12	− 1.65	22.23	− 4.20	81.1	+2.5	89.7	72.5
San Francisco	T	− 0.01	7.07	− 5.41	56.4	−2.9	62.1	50.6
Seattle	T	− 0.87	13.23	− 4.25	63.2	−2.0	71.9	54.5

T traces (less than 0.005 inches)

Precipitation range in 20 cities, in inches

Table shows range observed 33.3% of time. Rainfall heavier 33.3% of time, lighter 33.3% of time.

Computed by U. S. Weather Bureau (based on historical records of actual precipitation)

City	Sept.	Mid. Sept.-Mid. Oct.	Oct.	Mid. Oct.-Mid. Nov	Nov.	Mid Nov.-Mid Dec.	Dec.	Mid Dec.-Mid Jan.	Jan.	Mid Jan.-Mid Feb.	Feb.	Mid Feb.-Mid Mar.	Mar.	Mid Mar.-Mid Apr.
Atlanta	1.69/3.60	1.64/3.35	1.59/2.90	2.01/3.38	2.43/3.85	2.94/4.58	3.46/5.30	3.42/5.32	3.39/5.33	3.38/5,50	3.36/5.67	3.40/6.00	3.43/6.33	3.12/5.72
Baltimore	2.10/3.36	1.88/3.57	1.66/3.77	1.16/3.45	1.56/3.12	1.99/3.43	2.41/3.73	2.59/3.85	2.77/3.96	2.57/3.68	2.36/3.39	2.48/3.76	2.59/4.13	2.59/4.17
Birmingham	1.71/3.69	1.62/3.14	1.52/2.58	1.84/3.24	2,17/3.91	2.94/4.83	3.71/5.75	3.75/5.58	3.75/5.40	3.61/5.64	3.47/5.88	4.18/6.26	4.48/6.63	3.91/5.85
Boston	2.04/3.70	2.26/3.88	2.49/4.07	2.62/4.26	2.74/4.46	2.82/4.33	2.89/4.20	2.83/4.12	2.39/3.45	2.70/3.99	2.64/3.93	2.12/3.58	2.94/4.50	2.66/4.45
Chicago	2.09/3.75	1.84/3.42	1.59/3.10	1.59/2.95	1.59/2.80	1.46/2.62	1.32/2.45	1.30/2.28	1.29/2.10	1.40/2.16	1.52/2.23	1.76/2.67	1.99/3.11	2.09/3.12
Cincinnati	1.79/3.08	N.A.	1.49/2.90	1.74/3.28	1.99/3.67	2.14/3.48	2.29/3.28	2.32/3.54	2.34/3.80	2.07/3.40	1.80/3.00	2.10/3.64	2.39/4.29	2.26/3.94
Cleveland	2.30/3.41	2.03/3.29	1.75/3.16	1.79/2.97	1.82/2.77	1.76/2.68	1.70/2.56	1.65/2.58	1.59/2.60	1.55/2.52	1.51/2.43	1.81/2.71	2.10/2.98	2.15/3.13
Dallas	1.77/3.10	1.66/3.30	1.55/3.50	1.60/3.25	1.64/3.00	1.36/3.00	1.09/3.00	1.24/3.05	1.39/3.10	1.49/2.70	1.59/2.30	1.96/3.08	2.34/3.86	2.50/4.68
Denver	0.52/1.05	0.57/1.08	0.62/1.10	0.46/0.89	0.29/0.68	0.34/0.72	0.39/0.77	0.28/0.64	0.19/0.50	0.26/0.54	0.34/0.58	0.46/0.84	0.59/1.10	0.96/1.75
Detroit	1.82/3.44	1.72/3.02	1.63/2.69	1.70/2.66	1.77/2.78	1.70/2.66	1.64/2.60	1.63/2.50	1.62/2.40	1.56/2.45	1.51/2.50	2.14/2.64	1.77/2.78	1.78/2.75
Kansas City	2.99/5.00	2.34/4.54	1.69/4.07	1.48/3.21	1.27/2.35	1.02/1.95	0.77/1.55	0.68/1.48	0.59/1.42	0.80/1.66	0.99/1.90	1.29/2.40	1.59/2.90	1.99/3.15
Los Angeles	T/0.03	0.08/0.32	0.15/0.60	0.20/0.95	0.26/1.30	0.70/2.00	1.14/2.70	1.19/3.00	1.24/3.30	1.12/3.25	0.99/3.20	1.06/3.08	1.13/2.95	0.68/1.92
Minneapolis	2.29/3.85	1.79/3.15	1.29/2.45	0.98/2.01	0.67/1.57	0.62/1.44	0.57/1.30	0.60/1.19	0.64/1.08	0.58/1.08	0.52/1.08	0.75/1.38	0.98/1.67	1.34/2.14
New Orleans	3.11/5.50	2.55/4.81	1.99/4.12	2.34/4.40	2.69/4.67	2.96/4.92	3.24/5.17	3.36/5.28	3.49/5.40	3.14/5.05	2.79/4.70	3.00/5.00	3.22/5.30	2.94/5.15
New York	2.21/3.40	2.15/3.76	2.09/4.13	2.15/4.04	2.21/3.95	2.42/3.86	2.64/3.77	2.55/3.71	2.46/3.65	2.41/3.88	2.36/4.10	235/4.08	2.34/4 05	2.40/3.92
Philadelphia	2.09/3.90	2.04/3.85	1.99/3.80	2.18/3.65	2.36/3.50	2.50/3.70	2.64/3.90	2.60/3.80	2.57/3.70	2.57/3.69	2.57/3.68	2.60/3.84	2.62/4.00	2.56/3.91
Pittsburgh	1.87/2.80	1.98/3.00	2.09/3.20	1.96/2.96	1.84/2.72	1.96/3.00	2.09/3.27	2.12/3.20	2.14/3.13	1.96/2.98	1.77/2.83	2.06/3.15	2.34/3.47	2.32/3.44
St. Louis	2.09/3.58	1.89/3.42	1 69/3.25	1.78/3.28	1.86/3.30	1.70/3.05	1.64/2.80	1.52/2.75	1.39/2.70	1.48/2.80	1.57/2.90	1.92/3.42	2.27/3.95	2.43/2.88
San Francisco	0.00/0.26	0.10/0.73	0.19/1.20	1.12/2.25	1.04/3.30	1.62/4.28	2.19/5.25	2.34/5.12	2.49/5.00	2.24/4.86	1.99/4.71	1.96/4.13	1.94/3.55	1.30/2.54
Seattle	1.07/2.20	1.70/2.85	2.32/3.50	3.07/4.55	3.82/5.60	4.00/5.74	4.17/5.89	4.14/5.57	4.12/5.25	3.34/4.92	2.55/4.60	2.18/4.02	1.81/3.43	1.72/3.16

T—Traces (Less than 0.005 inches)

Mean temperature range in 20 cities, in degrees F.

Table shows range observed 25% of time. Mean temperature higher 37.5% of time, lower 37.5% of time.

Computed by U. S. Weather Bureau (based on historical records of actual temperature)

City	Sept.	Mid. Sept.-Mid. Oct.	Oct.	Mid. Oct.-Mid. Nov.	Nov.	Mid Nov.-Mid Dec.	Dec.	Mid Dec.-Mid Jan.	Jan.	Mid Jan.-Mid Feb.	Feb.	Mid Feb.-Mid Mar.	Mar.	Mid Mar.-Mid Apr.
Atlanta	72.9/75.4	68.2/70.2	62.3/63.8	56.6/58.2	51.1/52.7	46.6/48.4	44.0/46.0	48.3/50.3	43.5/45.5	44.0/46.4	45.1/47.9	47.5/50.1	51.2/53.6	55.9/58.0
Baltimore	67.1/69.4	62.2/64.4	56.4/58.3	50.9/52.6	45.6/47.0	40.2/42.0	35.8/37.8	34.2/36.1	33.9/35.7	33.2/36.0	34.6/38.0	38.1/41.7	42.0/45.7	46.6/49.4
Birmingham	73.3/75.6	68.5/70.7	62.2/64.2	56.2/58.5	50.7/53.2	46.5/48.9	44.3/46.5	43.4/46.1	43.5/46.5	44.4/47.6	46.0/49.4	48.8/51.7	52.4/54.7	56.6/58.5
Boston	63.3/65.4	58.9/61.0	54.2/56.2	49.3/51.3	43.6/45.6	36.8/39.2	31.2/34.0	28.9/31.9	30.3/31.2	26.4/29.6	27.8/30.0	31.4/34.0	35.6/38.6	41.1/43.3
Chicago	64.5/66.7	59.3/61.7	52.8/55.3	45.9/48.6	38.6/41.5	31.2/35.0	25.7/30.3	23.7/28.5	23.2/28.1	23.1/28.1	24.7/30.0	29.2/34.2	34.6/39.1	40.9/43.8
Cincinnati	66.5/68.4	61.2/63.3	55.9/57.1	48.6/50.9	42.0/44.5	35.9/39.1	31.4/35.2	30.1/34.4	29.8/34.6	29.9/34.4	31.6/36.0	35.2/39.2	39.6/43.1	45.4/48.1
Cleveland	64.7/67.1	59.5/61.8	53.5/55.6	47.1/49.3	40.5/42.7	34.3/37.2	29.3/32.9	27.3/30.9	26.9/30.5	26.0/29.6	26.2/29.7	29.8/33.7	34.7/38.8	40.3/43.2
Dallas	78.1/79.7	73.8/75.1	68.5/69.4	61.4/63.1	54.3/56.7	49.9/52.3	47.0/49.3	44.8/48.1	44.1/47.5	45.8/49.2	48.8/52.2	51.9/55.6	55.5/59.6	60.1/64.0
Denver	62.2/63.4	56.7/58.3	50.8/52.8	44.5/47.2	38.0/41.4	33.5/36.7	30.5/33.5	28.3/31.4	27.0/30.0	27.9/31.5	30.5/34.7	33.1/36.8	35.9/39.1	40.4/43.2
Detroit	63.0/65.6	57.8/60.2	51.9/54.1	45.8/47.9	39.2/41.1	32.9/35.3	27.9/30.9	25.6/28.5	24.8/27.7	24.2/27.8	24.6/28.9	27.9/32.1	33.1/37.2	39.3/42.1
Kansas City	69.7/71.9	64.4/67.0	58.1/61.2	50.7/53.9	42.6/45.9	36.7/40.1	32.4/35.9	30.4/33.0	30.0/31.9	30.2/33.6	32.2/37.1	37.3/41.2	42.9/45.9	48.6/51.3
Los Angeles	65.9/67.3	64.4/65.9	62.7/64.2	60.5/62.1	57.9/59.8	56.5/58.2	54.9/56.5	53.4/54.8	52.7/54.0	53.6/54.3	52.9/55.1	54.1/56.3	55.4/57.4	56.6/58.4
Minneapolis	61.0/63.6	55.5/58.3	49.8/51.7	40.4/44.5	30.9/36.0	24.5/28.1	17.2/22.3	13.8/18.4	13.4/16.5	13.3/17.7	15.0/20.8	21.7/25.9	29.9/32.5	37.3/39.5
New Orleans	78.5/79.7	75.1/76.5	70.5/71.9	64.6/66.8	59.0/61.5	56.0/58.5	54.6/56.8	53.2/56.0	52.6/56.0	54.0/57.4	55.9/59.3	57.6/60.8	60.6/63.0	63.4/65.7
New York	67.4/69.0	62.7/64.3	57.0/58.6	51.8/53.2	46.5/47.9	40.2/42.3	34.6/37.5	34.5/35.2	32.0/34.6	30.9/33.6	30.9/33.6	34.1/36.8	38.7/41.3	43.6/46.0
Philadelphia	66.8/68.5	61.6/63.5	55.6/57.6	50.3/52.3	45.3/47.2	39.9/42.0	35.1/37.3	32.7/35.4	31.8/35.0	31.1/34.3	32.3/35.3	36.4/39.2	40.8/43.5	45.6/47.9
Pittsburgh	64.0/65.9	58.8/60.9	52.0/54.4	46.2/48.2	40.3/42.0	34.0/36.4	29.5/32.6	24.8/28.0	26.9/30.1	26.4/30.5	26.9/32.0	30.5/35.4	36.0/40.6	43.9/46.5
St. Louis	69.1/71.2	64.0/66.3	58.1/60.5	51.0/53.9	43.6/46.9	37.6/41.2	33.3/37.1	30.9/35.1	30.1/34.7	31.3/35.7	33.7/38 1	37.8/41.8	42.9/46.3	48.6/51.5
San Francisco	61.3/62.8	60.4/62.0	58.5/60.2	56.4/57.9	53.8/55.0	50.7/52.3	48.7/50.2	47.1/48.9	46.9/49.1	48.3/50.8	50.0/51.7	51.0/52.8	51.7/53.5	52.4/54.2
Seattle	58.0/59.0	54.8/56.1	51.0/52.5	41.8/43.8	43.1/44.5	41.0/42.4	39.4/40.7	37.7/39.0	37.2/38.5	38.2/40.0	39.7/42.0	41.7/43.3	43.6/44.7	45.6/47.2

TOLEDO, OHIO

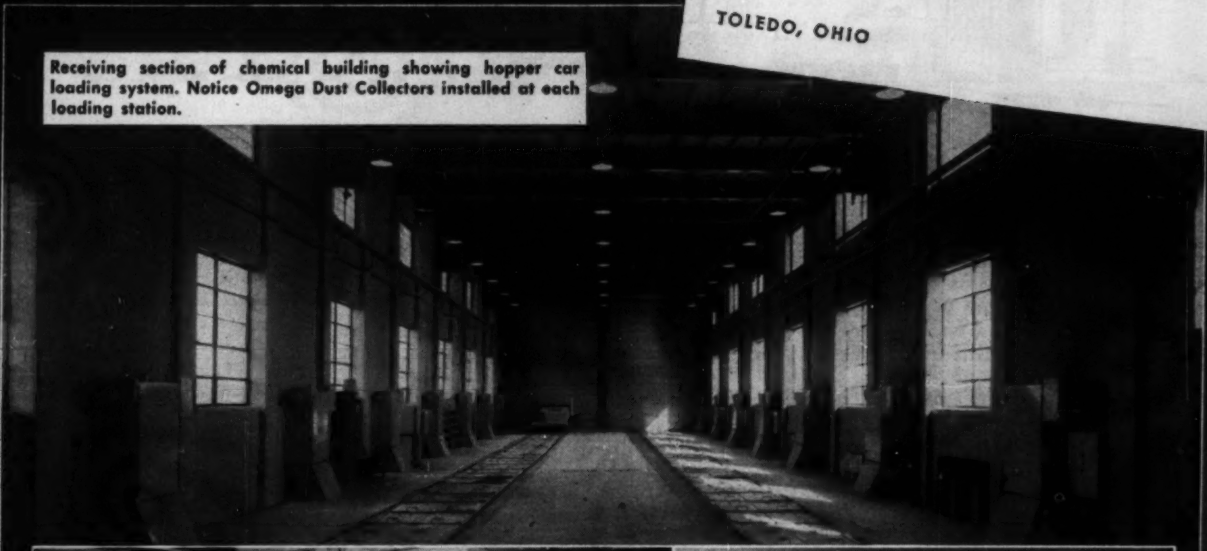
Collins Park Filtration Plant

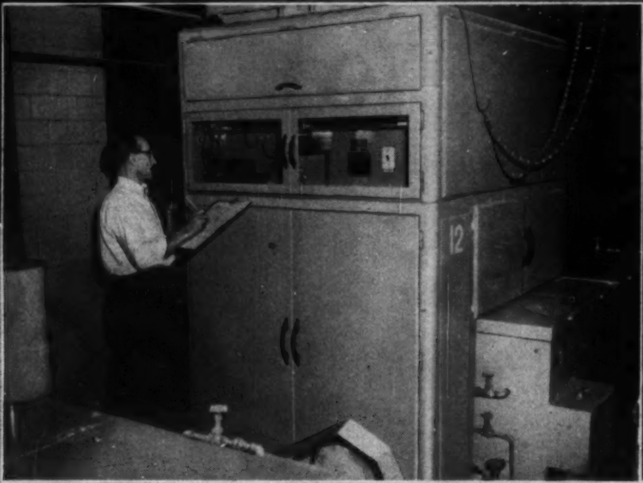
(COMPLETED IN 1954)

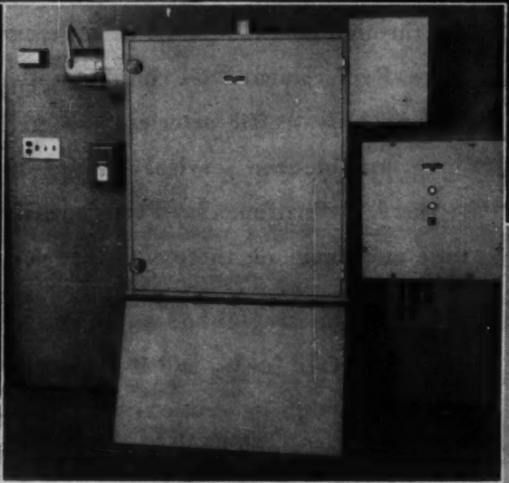
FINKBEINER, PETTIS & STROUT
Consulting Engineers

TOLEDO, OHIO

Receiving section of chemical building showing hopper car loading system. Notice Omega Dust Collectors installed at each loading station.







Omega Model GLW-2 Loss-in-Weight Gravimetric Feeder with Lime Slaker. This type of feeder was chosen in order to gain maximum accuracy of chemical feed control.

Close-up of Omega Dust Collector with its unitized motor control. Dust Collector is operated only during chemical loading periods.

Toledo, known far and wide as the "glass city", draws its water supply from nearby Lake Erie. Wide seasonal fluctuations in raw water quality demand highly adaptable chemical and mechanical water treating facilities. Omega was selected to supply the chemical feeding and lime slaking equipment needed for this exacting task. As shown in the photos, this equipment has been engineered into a modern chemical storage and feeder building designed for maximum efficiency of chemical handling. For complete details on Omega Water Works Equipment furnished for the Collins Park Filtration Plant, write Omega Machine Co., Providence 1, R. I.

OMEGA *THE LAST WORD IN* **FEEDERS**

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on BIG expressway projects

...LOOK FOR CLAY PIPE

In Chicago's new Wacker Drive Extension, part of a $469 million expressway program, thousands of feet of Vitrified Clay Pipe in diameters ranging from 8 to 27 inches are being installed. As in similar projects all over the country, this modern expressway cuts through dozens of existing sewerage lines. Replacement lines running under these busy traffic arteries *must* give long, trouble-free service. That's why you find Vitrified Clay Pipe specified time and again on these vital projects.

Clay Pipe has the strength to stand up under heavy surface loads, and it *keeps* that strength through generations of service. Acid sewer gases or corrosive industrial wastes can't weaken it. *It never wears out.*

12:58
Coca-Cola

Vitrified CLAY PIPE

CLAY PIPE NEVER WEARS OUT!

C-755-1

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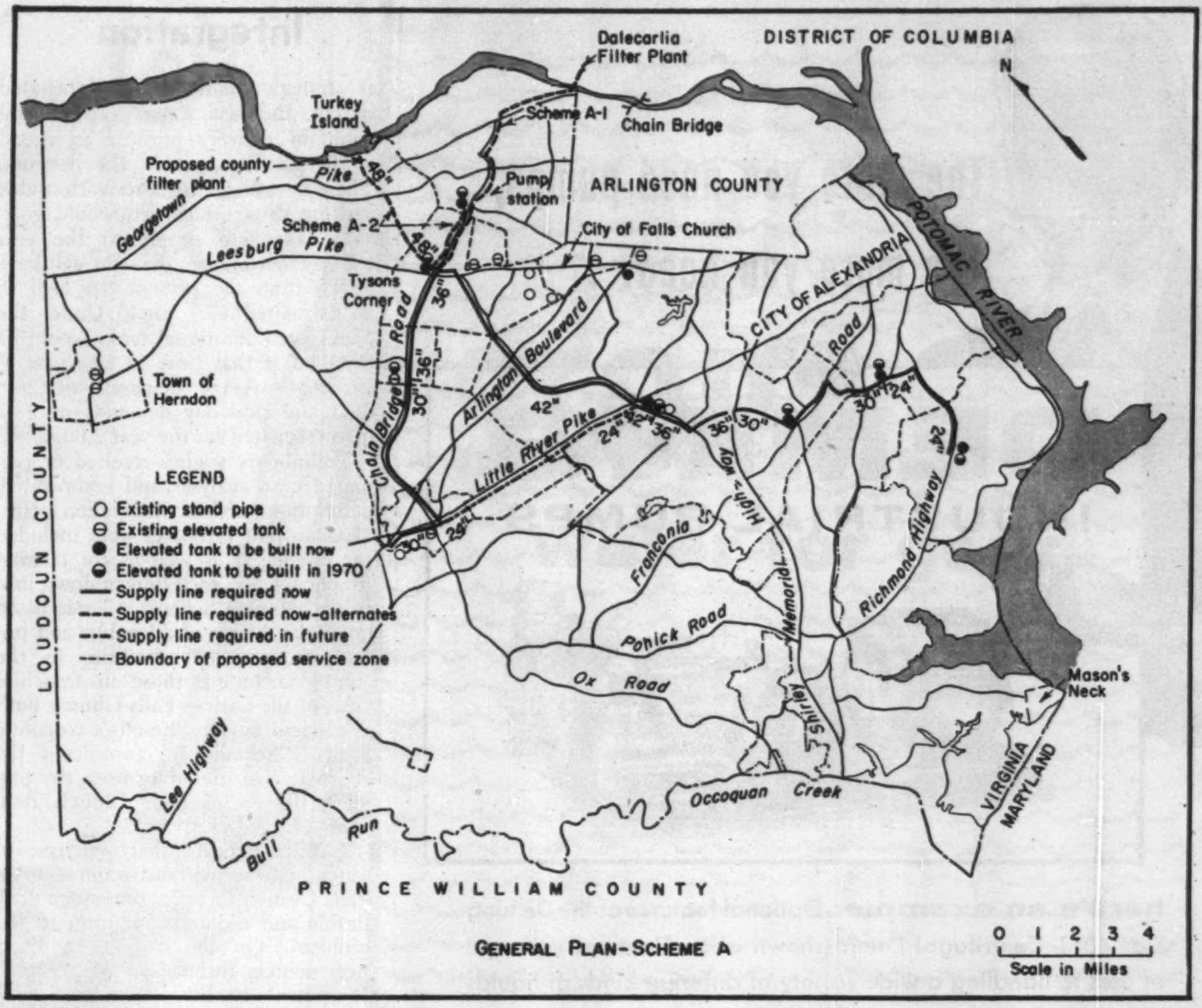

DISTRICT OF COLUMBIA
Dalecarlia Filter Plant
N
Turkey Island
Scheme A-1
Chain Bridge
Proposed county filter plant
Georgetown Pike
48"
Pump station
ARLINGTON COUNTY
Scheme A-2
48"
City of Falls Church
Leesburg Pike
Tysons Corner
36"
Chain Bridge Road
30"
36"
Arlington Boulevard
42"
CITY OF ALEXANDRIA
POTOMAC RIVER
Road
30"
24"
Town of Herndon
Little River Pike
24"
12"
36"
36"
30"
24"
Highway
Richmond Highway
Memorial Highway
Franconia
Pohick Road
Ox Road
Shirley
LOUDOUN COUNTY
LEGEND
○ Existing stand pipe
⊖ Existing elevated tank
● Elevated tank to be built now
● Elevated tank to be built in 1970
Supply line required now
Supply line required now-alternates
Supply line required in future
Boundary of proposed service zone
Lee Highway
Bull Run
Occoquan Creek
Mason's Neck
VIRGINIA
MARYLAND
PRINCE WILLIAM COUNTY
GENERAL PLAN-SCHEME A
0 1 2 3 4
Scale in Miles

NATURAL TOPOGRAPHY AND GEOGRAPHY spell solution to problems of 139,000 water users—twice that number in 1970.

Integration—Is It the Cure for Water Troubles?

County that brought all sewerage under one agency has assurance that plan could work for water, too.

Facing an inadequate supply of water in the near future and a complicated problem of providing plant and distribution facilities to fulfill its needs, Fairfax County Va., may resort to the same device that is counted upon to cure its sewage disposal woes.

With the integration of seven public and private sewer district systems under a single administrative agency (Board of County Supervisors), the northern Virginia county is pushing a $17.1-million program of treatment plant construction, pipe installation and facilities acquisition that is designed to serve the area adequately, far into the future (ENR, Sep 30, 1954, p 34).

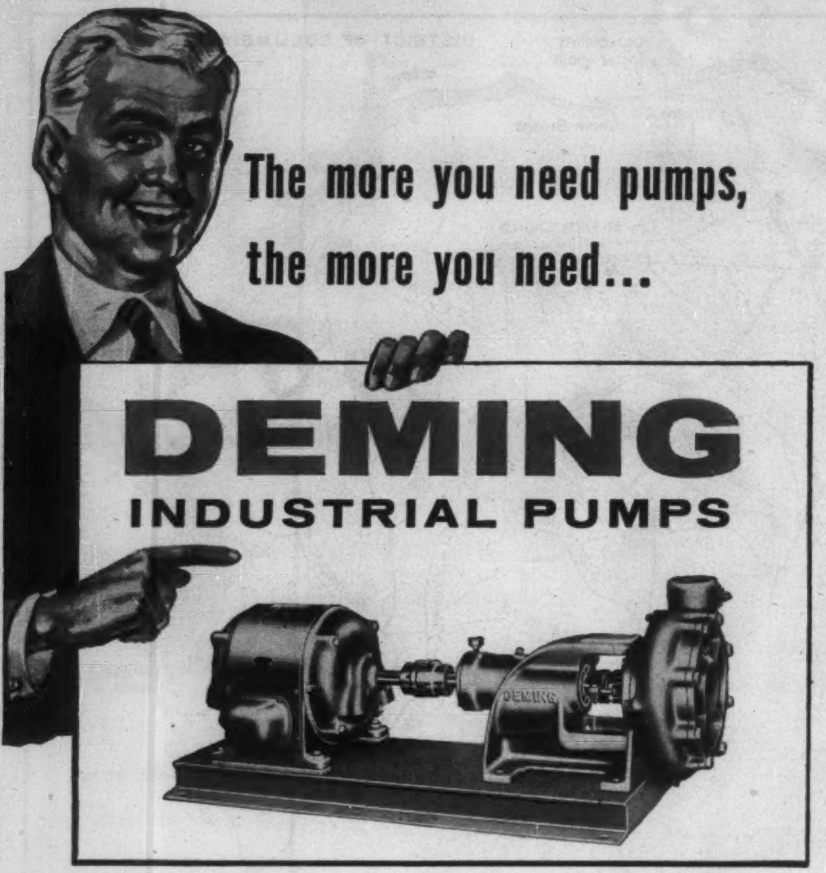
Integration of sewerage facilities was shown to have a distinct cost advantage over other solutions to the Fairfax problem, ostly through eliminating duplication of plant, administration and operation costs. The question was: could it work for water supply, too?

Studies indicate that with few exceptions, 19 existing water companies now serving the county area are inadequate to render service essential to present needs or future growth. A report on the county's problem and its possible solution has been presented by Alexander Potter Associates, consulting engineers of New York City, and it is their recommendation that water supply and distribution facilities be integrated under county jurisdiction also.

It has been found, according to the firm, that it is economically and physically feasible for all existing water systems—there are four public and 15 private companies—to be joined into a single system that can be served by a county-developed and -operated source of supply from the Potomac River, or by purchasing water from the District of Columbia immediately to the north and across the river from Fairfax County.

• **Topography is the key**—Sitting at an elevation of 518 ft—the highest point in the county—is Tyson's Corner, located only four miles from the potential Potomac River source and less than seven and one-half miles from the Dalecarlia Filtration Plant that supplies Washington, D. C. Water from either source could be pumped to primary storage facilities at Tyson's Corner and from there all transmission would be accomplished by gravity.

By maintaining a 600-ft high-water level in the primary storage tank, and by erecting seven new elevated tanks


The more you need pumps,
the more you need...

DEMING
INDUSTRIAL PUMPS

here's an example: Optional features of the Deming Fig. 4011 Centrifugal Pump (shown above) extend its scope of uses to handling a wide variety of different kinds of liquids . . . corrosive or non-corrosive. In many cases, this versatile pump eliminates the need for higher-cost pumps built entirely of corrosion-resistant metals. Other optional features include a choice of impellers and either stuffing box, or mechanical seal construction. BULLETIN No. 4011 explains this popular Deming Pump. Send for copy.

NOTE THE SCOPE OF THE DEMING LINE

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. . . Integration

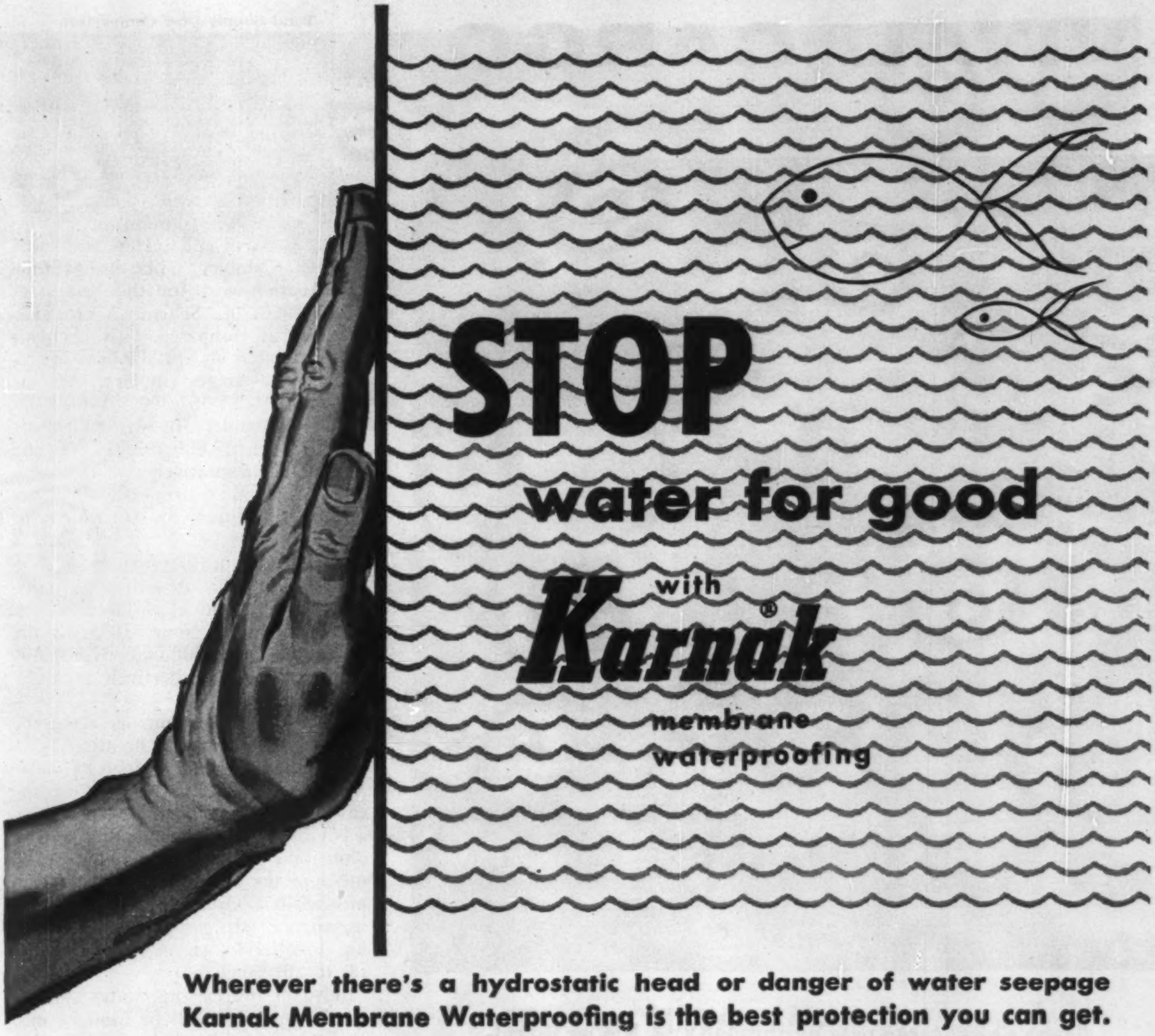
at strategic points in the integrated system, the new water agency could maintain delivery pressure in excess of 40 psi anywhere in the network. These new tanks, together with usable existing storage facilities, would guarantee adequate supply to the year 1970, when average demand will have grown from the present 8.6 mgd to an estimated 17.7 mgd. Under the plan, seven additional tanks would be installed at that time to take care of expected average demands of 28.8 mgd and peak-day demands of 43.2 mgd estimated for the year 2,000.

Preliminary studies resulted in estimated cost analyses and comparative descriptions of four integration plans. Separate cost estimates were included for purchased as well as for county-supplied water, each broken down into two schemes. "Scheme A" was based upon acquisition of all public and private water supply facilities in the county including those in franchise areas of the City of Falls Church both inside and outside the city's corporate limits. "Scheme B" considered the alternative of excluding from the program the entire Falls Church franchise.

Results indicate that purchase of water, with or without acquisition of Falls Church facilities presents a practicable and economic solution to the problem. On the basis of a direct river source, installation of pumping equipment to lift water from river level to elevation +300 in the first lift, thence to +600 in the second would cost an estimated $650,000. But under the water-purchase plan, water from the Dalecarlia source would be drawn at an elevation of +422, thus eliminating most of the initial pumping facilities cost.

In addition, the treatment facilities including intake structure and diversion dam would cost an estimated $3.2 million. In all, supply facilities under the direct river source plan would cost $6.14 million as compared with $2.97 million for the Dalecarlia purchase plan, which includes the longer supply line and river crossing.

Operating costs for the direct source are estimated at $301,000 (annual average for the first 15 years) as compared with the Dalecarlia source figure of $82,000. Water purchased from the district, however, would cost $336,000 based upon a proposed rate of 80¢ per mg. This would bring the Dalecarlia total to $408,000, or $107,000 more than the direct source annual operating cost. New operating costs, however, heavily favor Dalecarlia.



Wherever there's a hydrostatic head or danger of water seepage Karnak Membrane Waterproofing is the best protection you can get.

Karnak membrane fabric is saturated so that it is non-sticking and unrolls easily... to the very end. There is no waste. It "works" faster, lays on wrinkle-free...saves labor cost on the job.

Open mesh, long-fiber-cotton cloth, saturated with specially prepared asphalt so as to leave the mesh open, is layered on the job with alternate moppings of highly refined, ductile asphalt. The open mesh allows the mopping asphalt to penetrate and interlock the layers. This provides a firm, mechanical bond that resists abrasions, settling and cracking thus maintaining water resistance through the life of the structure.

The layering of fabric and asphalt is the only method of waterproofing that insures proper thickness of asphalt throughout the application. For normal application with hydrostatic head up to 15 feet, two plies of fabric are sufficient; hydrostatic head of 15 to 20 feet takes three plies; four plies are sufficient to waterproof any class of work regardless of hydrostatic head.

Whatever *your* waterproofing problem, Karnak will prove best. Bridges, buildings, tunnels, retaining walls, viaducts, swimming pools, all need and use Karnak. The Merchandising Mart, Chicago, Ill., used Karnak over twenty-five years ago...the Fairless Works of U.S. Steel used it last year. Specify Karnak on your next waterproofing job.

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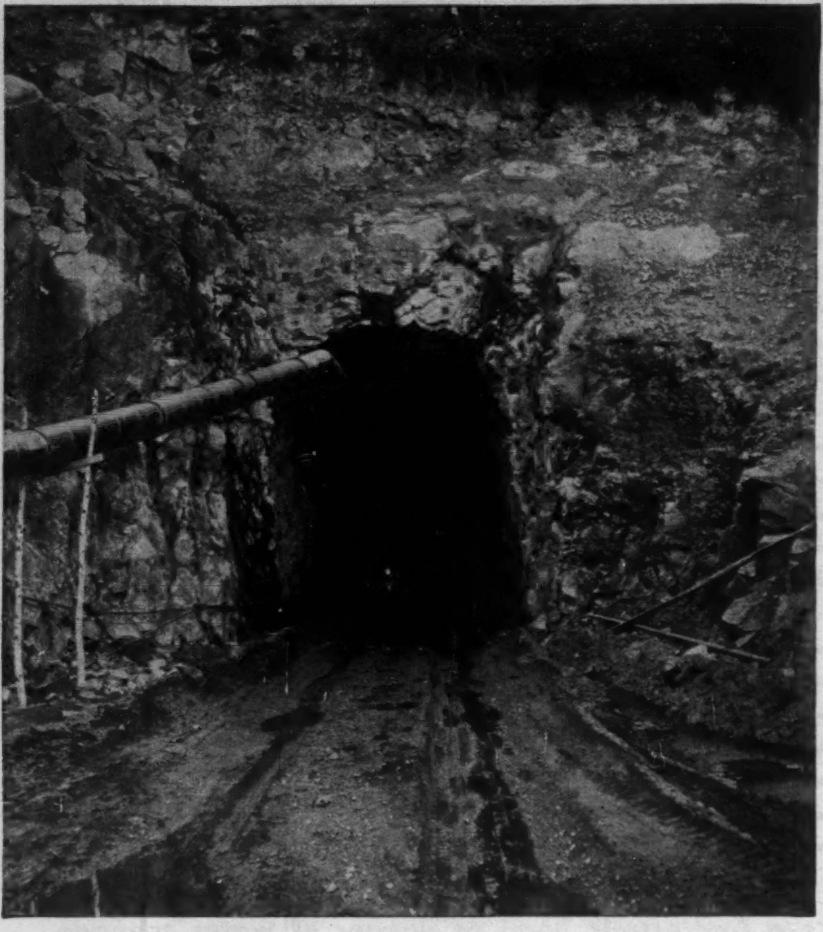
VITAL CARGO



There's vital cargo passing through this Naylor Spiralweld pipe because this line is pushing in fresh air to the heading and pulling out stale air, gases and fumes. There's no more vital ingredient than air in underground construction and no better vehicle for it than this distinctive pipe. Lightweight makes Naylor easy to handle and install as work progresses . . . particularly with the one-piece Naylor Wedge-Lock coupling to speed connections. Extra strength and safety are other performance features built into this pipe.

Write for Bulletin No. 507 for the complete story.

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Total Supply Cost Comparison
(including Falls Church)

	Dalecarlia	Direct River
Capital Cost	$2,977,000	$6,140,000
Annual Operating Cost	$408,000	$301,000
Annual Non-operating Cost..	152,000	313,000
Total Annual Costs.	$560,000	$614,000
(not including Falls Church)		
Total Annual Costs.	$487,000	$523,000

Installation of supply lines to zones, truck mains, distribution mains, hydrants, services and meters and fabrication of storage tanks brings total construction cost for the first stage (1955-1960) of "Scheme A" to $12,938,000 as compared with "Scheme B," estimated at $11,506,000. Three subsequent stages under "A" are 1960-1965, $3,967,000; 1965-1970, $2,684,000 and 1970, $2,258,000; and for "B", $3,169,000, $2,225,000 and $1,915,000 respectively.

Acquisition, contingent allowance and interest during construction bring the total program costs for "A" to $23,350,000 for the first stage, $5,050,000 for the second, $3,350,000 for the third and $2,810,000 for the fourth. For "B", comparable costs are $20,100,000, $4,000,000, $2,800,000 and $2,400,000, respectively.

• **Users pay**—All financing, according to the report, can be by bonds at 3½%. Recommended are Fairfax County Water Revenue Bonds, or as in the case of the integrated sewer system, a combination of revenue and general obligation bonds. Money for retirement of the bonds would be derived principally from water rates and water installation charges (water main extensions, service connections and meter installations).

Two of the existing water systems would not at present be brought into the network. The town of Herndon on the northwestern boundary of the county is supplied by wells that are among the few in the county reported to be satisfactory and their production adequate for present town needs. No economic advantage is seen in connecting this town with the system until demand warrants it. At present Herndon supplies a population of 1,206 and is one of the four publicly owned water companies. The other area is at the opposite end of the county, supplying 59 residents of the Mason's Neck area, which again is too remote from the Tyson's Corner to warrant connection to the county system until future development warrants it.

Total current county population is 162,000—not including Falls Church, which already is supplied by Dalecarlia—with 139,000 in service zones. Of these, only 61,500 are connected to water systems. By 1970 the population will have increased to 235,000 with 210,000 in service areas. Under

Water, Water Everywhere but
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ON THE
ARKANSAS
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KEEPING THE WATER LEVEL DOWN with a wild, often summer-flooded river like the Arkansas all around you is a big order. That's why the STANG Wellpoint Engineers were called in to make possible the laying of this 54" water conduit with the river open.

STANG has successfully handled water problems the world over for many years. Our trained engineers have the capability and experience necessary to design the *exact* system to most efficiently and economically beat your particular unwatering problem.

If you have a water problem on a current project (or on one you may be bidding) contact STANG. You will receive a thorough analysis of your project needs and our recommendations *at no cost or obligation to you.*

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THE BEST DIAPHRAGM PUMP *Ever Built!*

GORMAN-RUPP Firsts — among all other diaphragm pumps of like size and type.

- Diaphragm drive rod spring-cushioned on down stroke. Runs smoothly. Increases diaphragm life **10 Times.**
- More Pumping — by as much as 400% at 25 feet static lift.
- Suction Accumulator provides continuous smooth flow of water.
- One man handling — engine driven pump only 130 pounds job-to-job. Motor driven 165 pounds.
- Easy hook-and-tighten fittings with hose connected.

See this pump at work on the job, through your Gorman-Rupp distributor. It is absolutely guaranteed to outperform and outlast any 3 in. single diaphragm pump comparably powered now on the market.

Ask for information bulletin 4-DR-11

NOTES FROM THE FIELD - -

Bridging Kokosing River on U. S. Route 36 at Mount Vernon, O. Model 3D-E1½ diaphragm pump and model 3362-B contractors' pump, both electric powered, and model 3205 contractors' pump engine powered – On The Job.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

the integrated system, 199,000 of these will be connected, representing 85% of the total population as compared with 38% now served.

• Trunks and mains big item—In all schemes, supply lines, trunk mains and distribution lines represent the largest part of the costs. For "Scheme A", the supply line to primary storage is estimated at 39,500 linear feet of 48-in.-dia pipe. 147,000 L.F. of supply lines to service zones range in size from 24-in.-to 42-in.-dia, and an additional 24-in.-dia line designated as the Little River Pike Line adds 38,600 L.F. to the estimate. The total supply lines network would involve installation of 226,100 L.F., or 42.82 miles.

Storage facilities in the first stage would include one 0.5-mg tank, five 1.0-mg tanks and one 4.5-mg tank to give a total storage of 10 mg in addition to that usable under the present multi-system operation. Fourth-stage would add one 0.2-mg, one 0.4-mg, four 4.0-mg and one 2.0-mg tanks for an additional 16 million gallons.

• Fairfax isn't the only one—A plan also has been submitted to the Greensboro, N. C., city council for a six-city dam, water filtration plant and power station on the Yadkin River at Styer's Ferry, 14 mi west of Winston-Salem, which would be designed to furnish enough water to supply large areas of Guilford, Forsyth and Davidson Counties for the next 50 to 100 years.

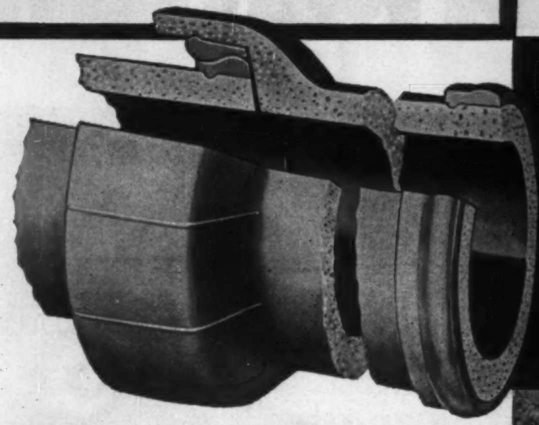
The water, filtered at the dam, would be pumped through a pipeline directly to Winston-Salem and Greensboro, and branches would serve Kernersville, High Point and the Lexington-Thomasville area. Sponsors of the program say that the project would provide treated water more cheaply than it could be supplied by separate filter plants at the various cities, and it would also enable the integrated authority to sell water directly to smaller rural communities and other buyers.

Construction of the hydro-electric plant—one large enough to furnish power to pump the water to the cities—would mean resurrecting old High Point Hydro-electric Project plans of the federal government for a high-dam, power plant and lake that would back water many miles up the Yadkin and its tributaries.

Problems anticipated are the flooding of two expensive bridges that have been built since abandonment of the federal plans several years ago and the repurchase—some by condemnation—of land that was bought by the federal government for the originally planned project, then re-sold when it was dropped.

It's Here

the tightest, fastest-working joint ever developed for bell-and-spigot Clay Pipe!



New Wedge-Lock*

by ROBINSON

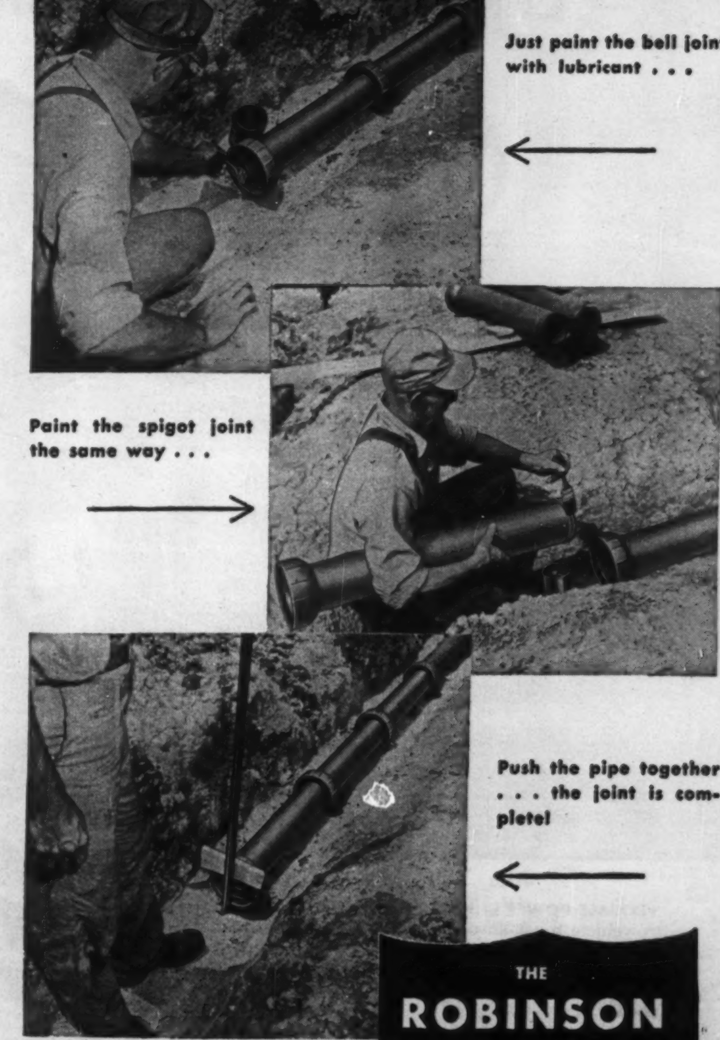
PERMANENTLY BONDED DOUBLE-BALL JOINTS ON BELL AND SPIGOT "SNAP" TOGETHER FOR A PERMANENT, LEAK-PROOF SEAL!

Soon anyone will be able to make perfect Clay Pipe joints — easier and faster than ever before! Installing Wedge-Lock is simply a matter of lubricating the plastic joints with water, graphite solution, or Robinson's special adhesive sealant — and pushing them together. The "double-ball" type joint locks pipe in place . . . and is permanently *root-proof* and *infiltration-proof*.

This new pipe can be installed not only in regular house-to-sewer lines, but inside plastered walls and under basement floors. For inside-the-house installations, where "head" pressures are encountered, Robinson's special adhesive sealant is recommended. It softens the two jointing surfaces, welding them into a single, solid ring.

This new polyvinyl plastic joint, combined with never-wear-out vitrified clay, will form the *perfect* team . . . pipe that can be installed in seconds to last for generations!

A complete line of matching Wedge-Lock Fittings is available.



Just paint the bell joint with lubricant . . . ←

Paint the spigot joint the same way . . . →

Push the pipe together . . . the joint is complete! ←

* T.M. Registration Applied For. Patents Pending.

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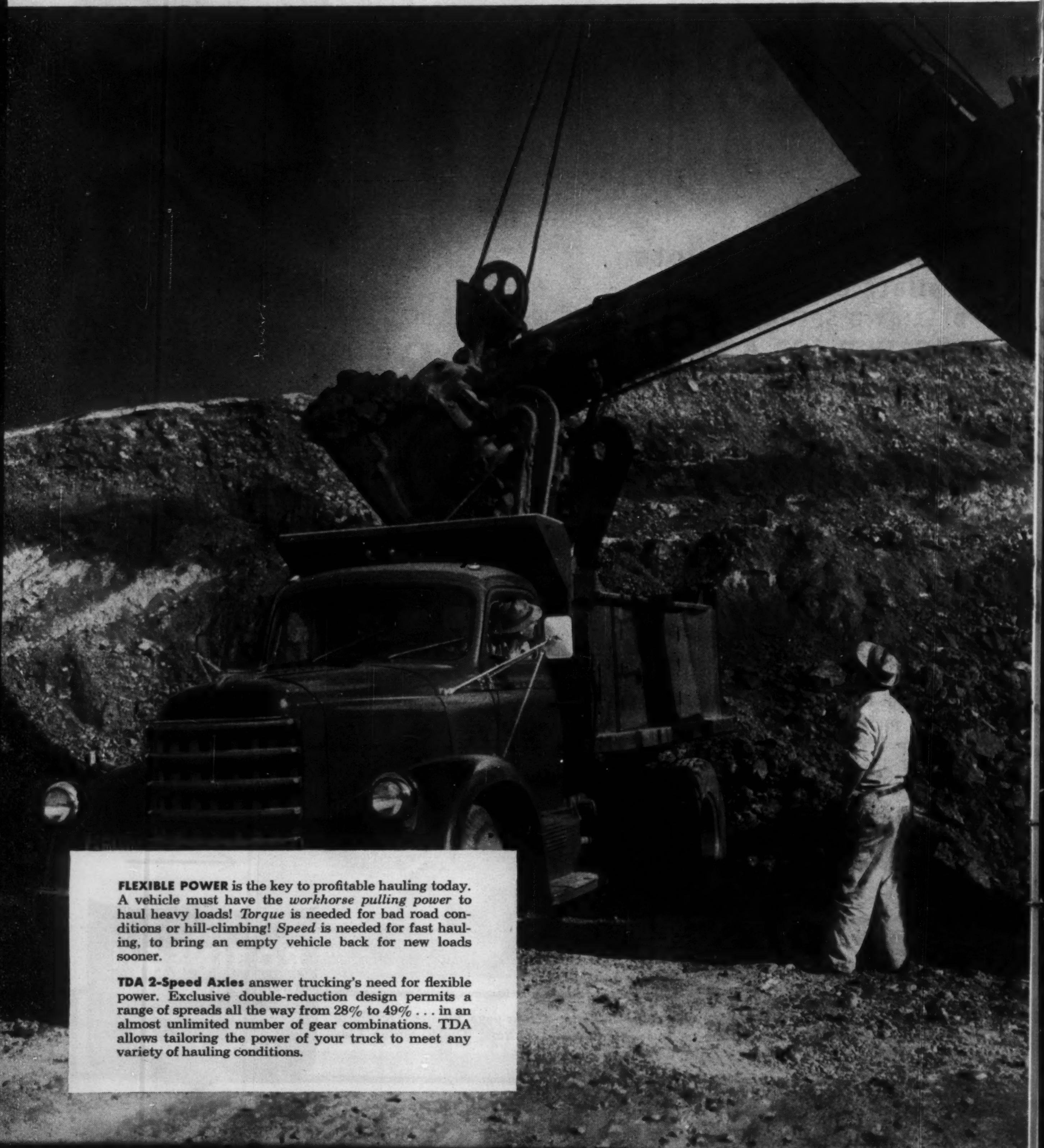
CLAY PRODUCT CO.
ESTABLISHED 1856
AKRON 9, OHIO

WRITE FOR the new Wedge-Lock Clay Pipe Bulletin, a four-page file-sized brochure with complete, advance information on this new product. Address: The Robinson Clay Product Company, 65 W. State St., Akron 9, Ohio.

R 254-7G

TAILORED POWER



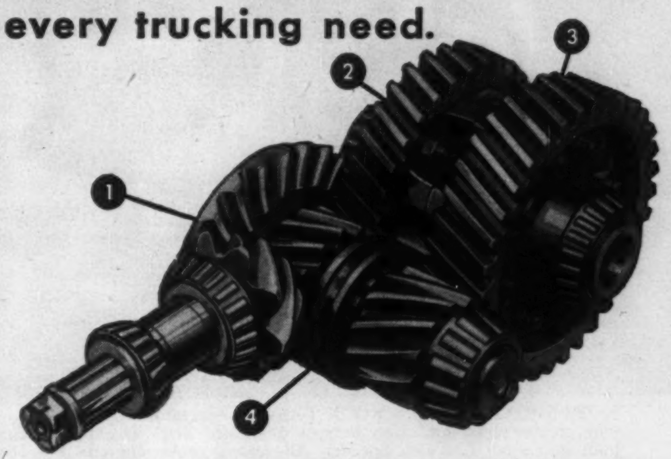
FLEXIBLE POWER is the key to profitable hauling today. A vehicle must have the *workhorse pulling power* to haul heavy loads! *Torque* is needed for bad road conditions or hill-climbing! *Speed* is needed for fast hauling, to bring an empty vehicle back for new loads sooner.

TDA 2-Speed Axles answer trucking's need for flexible power. Exclusive double-reduction design permits a range of spreads all the way from 28% to 49% . . . in an almost unlimited number of gear combinations. TDA allows tailoring the power of your truck to meet any variety of hauling conditions.

COMES TO TRUCKING

with TDA 2-speed axles

Exclusive, double-reduction design offers almost unlimited possibilities of gear ratios and ratio spreads—this versatility provides tailored power for every trucking need.



How TDA's extra "spread" works to your benefit. *All* 2-speed axles employ an extra set of gears to give two ranges of speed or power to choose from . . . one for *pulling power*, the other for fast speed. Most 2-speed axles offer only one choice of "spread"– 37%. Design limitations prevent changing this standard "spread".

However, TDA uses the exclusive double-reduction design. With TDA, spreads are available all the way from 28% to 49%. This means that your axle can actually be tailored to give you just the power you need. Not only can you specify the spread most suited to your immediate trucking need – but you can easily *change* from one spread to another by merely changing the low speed helical pinion and gear – *an easy mechanical change.*

TDA's more efficient use of engine power gives important benefits . . . high road speeds, faster deliveries, better payload, and maximum fuel economy. No matter what your hauling problem or load/road conditions you save with TDA.

How TDA's 2-Speed principle works! A husky hypoid ring gear and pinion set (No. 1 above) provide the *first step* of the total gear reduction for both fast and slow ratios. Two large, heavy-duty helical gear sets provide the *second step.* Both sets are of balanced size and capacity. One set (No. 2) is for fast speed; the other (No. 3) is for slow speed. The clutch collar (No. 4) power shifts to right or left to engage one helical pinion or the other.

Greater endurance, longer truck life with TDA. TDA's simple design eliminates small complicated parts and midget size gears. Large hypoid-helical design provides more teeth in contact – quieter operation and far less strain. Bearings are larger, too. All this adds up to more profitable operation under all conditions.

TIMKEN AXLES
TIMKEN AXLES

Increase axle life with
GENUINE TDA EQUIPMENT PARTS

Take no chances with ordinary replacement parts. For sure, dependable, factory-type jobs, specify genuine Timken-Detroit Axle parts kits—identical to your axles' original equipment.

Each kit is complete—gives you everything you need in one handy package. Gaskets and shims, brake liners and rivets, steering knuckles, king pins and bushings, differential nests—for every size of brake and axle. Order by number from your dealer. Cut labor and adjustment costs. Get trucks back on the road quicker.

TIMKEN
Detroit
AXLES
TIMKEN DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted TDA CO Standard
TRADE MARK REGISTERED

World's Largest Manufacturers of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio New Castle, Pennsylvania

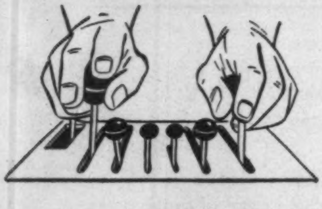
©1955 RS&A Company

K-580 SHOVEL MOVES ROCK FASTER—operator works with greater speed and safety because of greater "live" weight built into every Link-Belt Speeder. All-welded, stress relieved construction gives greater strength per pound. Alloy cast-iron clutch shells assure superior friction, longer lining life. Independent rapid boom hoist has power control up *and* down.

Now every Link-Belt Speeder shovel-crane has *Speed-o-Matic*®

—no lag, no jerk, no strain—

IT'S FULL POWER HYDRAULIC CONTROL



Today Speed-o-Matic controls are *standard equipment* on every size rig in the entire Link-Belt Speeder line! Full power hydraulic control is your key to 25% extra production . . . more consistent profits in the ½ to 3-yard, 6 to 60-ton work range. Here's why:

- REDUCED OPERATOR FATIGUE—fingers, instead of muscles, put full power to work.
- SMOOTHER CYCLES—complete cycle is one fluid motion.
- MORE ACCURATE CONTROL—operator always safely *feels the load.*
- REDUCED CLUTCH ADJUSTMENTS—clutch piston is self-compensating for normal lining wear and heat expansion.
- 150 WORKING PARTS ELIMINATED—maintenance costs cut.

Join thousands of alert owners who are making more money with Link-Belt Speeders. Contact your Link-Belt Speeder distributor for details. LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa.

13,731

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes

NEW PRODUCTS

CLIPS are set in place on lightweight beams then plywood sheets are installed.

K System Makes Form Stripping a Snap

Use of a two-ounce cast iron clip with lightweight steel structurals is saving a New York builder a pot of money on his forming costs. The 3-in. clips slip over the top flange of the steel beams to support plywood forms. When the placed concrete has set, a sharp rap snaps the clip and the plywood drops out.

The K system, as it is called, is reported to have saved an estimated $90,000 in the construction cost of a 12-story apartment building in New York City. Immediate plans call for eight more apartment houses to be built with the same method.

According to the developer of the system, the saving was the result of cutting an estimated $1 per sq ft off the cost of the concrete flooring. Actual cost was said to be about 45 cents to 50 cents per sq ft.

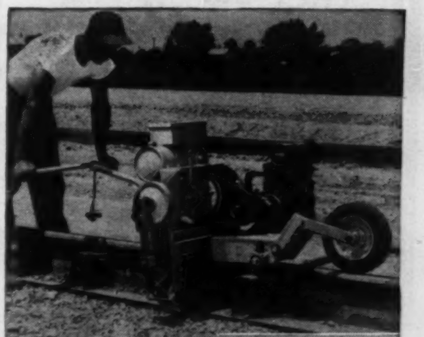
Not only is the system said to save time and materials, but it is reported to give the structure additional rigidity because the clip allows the concrete to come below the top flange of the Junior beam.

Most of the beams used on the job were 16 ft long and placed about 2 ft apart. When the concrete was about to be placed, a workman went along the beams and installed a clip approximately every 2½ ft. Then, two precut 8-ft plywood sheets were set between the beams. A single layer of welded wire mesh was used to reinforce the 2-in. layer of concrete.

After the concrete had set, the exposed part of the clip was knocked off. Although the clip sustains a heavy normal load, it cannot take a shock blow. When the clips had been broken, the plywood sheets dropped

CLIPS will support heavy loads of concrete but will not take sharp, shock loads.

TAMPS 25 FEET PER MINUTE!



Contractors Save Time And Money On Ohio Turnpike with "Form Tampers"

In just a few hours one man with a FORM TAMPER can tamp and oil the forms for the full day's run! And the FORM TAMPER does a better, more uniform job of tamping than can be done by hand. Result: a smoother concrete surface at lower cost—in less time.

SEND COUPON NOW FOR INFORMATION ON . . .

- FORM TAMPERS
- FORMGRADERS
- TRAIL GRADERS
- STRAIGHT EDGES
- SUBGRADE SCRATCH TEMPLATES

THE CLEVELAND FORMGRADER COMPANY

Mills Road, Avon, Ohio

☐ Send literature to:

Name____________________

Firm____________________

City________ Zone_____ State________

THEY SEE
EYE
TO EYE
A.W.FABER CASTELL LOCKTITE U.S.A. 2H
A.W.FABER CASTELL 9000 GERMANY HB

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CASTELL

*Wood Pencil #9000
Locktite Holder with gun-rifled clutch
*Castell 9030 Lead

The creative man wants the supreme quality of CASTELL—because it is smoother, stronger, undeviating in the uniformity of all its 20 degrees, 8B to 10H.

The purchasing agent wants CASTELL value—because it turns out many more sharp prints, saves money, saves man-hours.

For better drawings, sharper prints and greater value—use CASTELL, the drawing pencil with the master degrees.

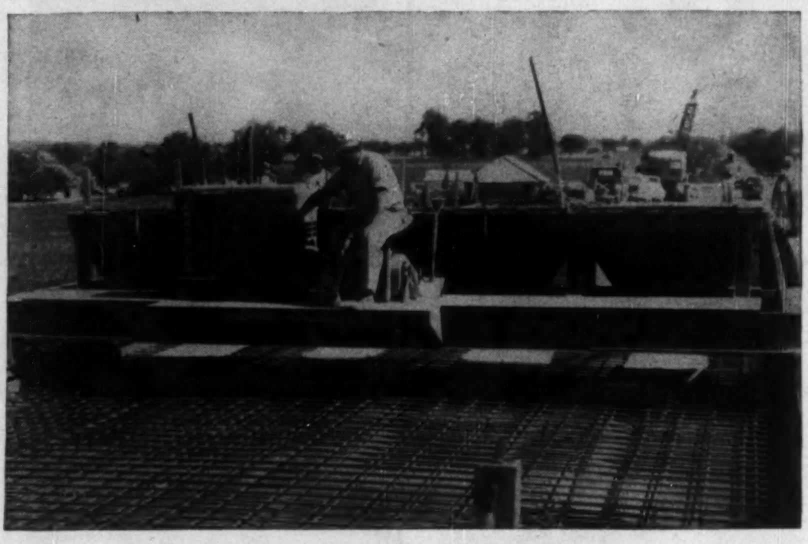
*Pat. appd. for.

A.W. FABER
CASTELL
PENCIL COMPANY, INC.
NEWARK 3, N. J.

down and were reused.

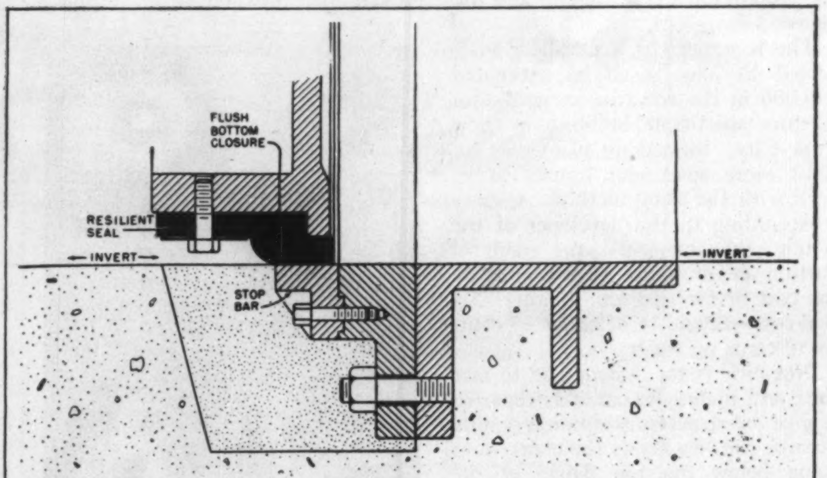
More than 45,000 clips were used in the building—approximately one for every 2 sq ft of construction.

It is planned that the clips will sell for 6 cents to 8 cents each depending on the size. The ones used on the above project were cast by the CROMPTON KNOWLES LOOM WORKS, WORCESTER, MASS.



Carrier Speeds Bridge Concreting

A new type of concrete conveyor car for use in bridge construction is rated at 80 cu yd per hr capacity. Said to be four times faster than the hand buggy method, the unit is reported to have poured a 300-ft bridge deck in half a day. Single-trip capacity of the car is 5 to 6 cu yd carried in four hoppers. The machine weighs 5 tons assembled (engine included) and is self-propelled. It has an 8-ft wide frame and runs on the same track used by the finishing machines. Length can be varied in 6-in. increments. When desired, addition of a vibratory screed permits use of the machine for finishing as well. Two of the cars are now in operation on the Ohio Turnpike. Penn Iron Works, Inc., Reading, Pa.



New Sluice Gate Improves Flow

On the new Hy-Q flush bottom closure sluice gate, the frame has been lowered so that the opening is flush with adjacent chamber floors or with the natural bottom floorline, and the gate seats flush with the invert. It eliminates the barrier which must be built for many gates to seat against or the deep pocket in which wedges

(*Continued on page 268*)

"GREAT" for all-around utility work

says Supt. on Garden State Parkway contract

On their 14 mile section of the Garden State Parkway in Cape May County, New Jersey, Public Constructors, Inc., Pleasantville, are using a 19 mph rubber-tired Tournatractor for all-around utility work.

This 208 hp tractor works all over their widely-scattered 2¼ million-yard sand job. It often moves ahead of the company's 33 scrapers to clear trees and brush and handle pioneer dozing. At times, it is used to level cuts and fills and to doze around bridges and culverts. Because of its speed and maneuverability, tractor-on-rubber performs these utility assignments without interfering with production dirtmoving.

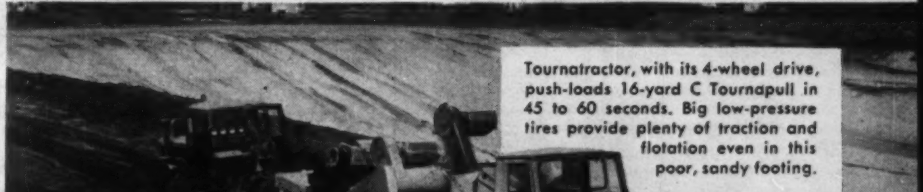
Besides leveling work, Tournatractor is also used to push-load some of the contractors' 11 C Tournapulls. Where material is pure white sand, tractor's fast pusher-service loads the 16-yd. "C's" in as little as 45 seconds.

Used for other scattered jobs

Tournatractor is always ready for emergency calls, too. Jobs 5 miles away can be reached in 20 minutes (or less) due to its 19 mph speed. Cleaning haul roads and dozing fill on distant sections of the job are handled quickly and efficiently. Paved highways present no travel problems for the tractor-on-rubber. It goes everywhere under its own power . . . needs no blocking, planking, trailer-loading and unloading. For all around utility service, it "gives a great performance day after day," says Supt. John Franks.

Discover for yourself why the fast, mobile Tournatractor is ideal for utility-type assignments, as well as major tractor work. Phone or write for a demonstration on your job, today. There's no obligation.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. T-837-H-b



Tournatractor, with its 4-wheel drive, push-loads 16-yard C Tournapull in 45 to 60 seconds. Big low-pressure tires provide plenty of traction and flotation even in this poor, sandy footing.

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Mall

POW'R TROW'L

Finishes Concrete

FAST, EASILY, ECONOMICALLY

4 POWER HEADS
- 4 cycle gas engine
- 2 cycle gas engine
- electric motor
- pneumatic motor

Before you Buy Check all these New Features

- New safety throttle control. If handle slips from hand, ring automatically stops and engine idles.
- New lifting eye-hook for raising or lowering machine from one floor to another.
- New clamp ring permits changing of power heads in seconds.
- New automatic recoil starter—fast and easy—no lost rope, no waste of time.
- New direct gear transmission delivers 97% of power to the blades.
- New quick-kick ring—a mere kick adjusts pitch of all three blades at once.
- New extra strong ⅝" diameter solid ring in 26", 36", and 45" sizes . . . all easily interchangeable.
- New reversible shoes and blades. Both edges can be used—gives double wear.
- Powers floating disc for dry tamp floors and grinding-grouting head.

SEE FOR YOURSELF—Phone or write the MALL office nearest you for a free demonstration. Do it today!

MALL TOOL CO. PORTABLE POWER TOOLS Gasoline • Electric • Air
7730 S. Chicago Ave., Chicago 19, Illinois

Send me a colorful descriptive folder on the new MALL POW'R TROW'L.

Name ____________________

Company ____________________

Address ____________________

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must descend.

On a conventional gate, wedges are on top, bottom and sides to force the disc tightly against the frame. The wedge system at the bottom must extend below the clear opening; the gate must slide down past a vertical wall barrier built square across the channel and projecting above the invert, or the bottom of the gate and the bottom wedges must drop below the invert in a pocket formed in the floor of the channel.

Like most sluice gates, the Hy-Q gate is of cast iron bronze-mounted construction. It is secured in its closed position by heavy bronze wedges on top and sides which hold it tight against the frame. However, the Hy-Q carries on the bottom of the gate disc a heavy strip of flexible neoprene. When the gate is closed, the neoprene flexes and provides a seal which compresses on the stop bar.

This design allegedly provides the benefits of narrow and broadface contacts on the sealing surface, and it can be adapted to both unseating and seating pressure conditions and to all types and sizes of cast iron bronze-mounted sluice gates.

An important feature of the gate is that it is not necessary to sacrifice up to 18 in. or so of the bottom of the channel with the concrete barrier required by conventional sluice gates. The head developed by additional effective depth of water can be an important factor in controlling flow. The Hy-Q gate, installed flush with the invert, uses all the water pressure available, and this type of installation permits extra headroom and space for gate and stem travel in indoor and underground locations.

According to the manufacturer, because of the greater head available, a smaller gate size, narrower channel and lower channel walls will sometimes serve for a given volume of flow, thus there can be substantial economies in concrete construction work. Rodney Hunt Machine Co., Orange, Mass.

PETTIBONE
SPEEDALL

Speedall Shovels Get Power Shift

Power-shift transmission, torque-converter and four-wheel drive through planetary axles are features of the new adidtions to the Speedall tractor-shovel line. 1¼, 1¾ and 2¼ cu yd units supplement the standard four-wheel drive Speedball units with torque converter. On the power-shift units the clutch pedal has been eliminated and two levers on the steering column shift the machine four speeds forward and four speeds reverse. The transmission provides a reverse speed that is 30% faster than the corresponding forward motion and this is said to reduce clutch wear by one-half in a majority of operations. The bucket is designed for 30-deg rollback and an automatic device levels the bucket as it is raised. Each of the new models is available with either a gasoline or diesel engine. Machines equipped with General Motors diesels are also equipped with Allison torque converters. All models have power steering and four-wheel hydraulic-vacuum booster brakes. Pettibone Mulliken Corp., 4700 W. Division St., Chicago, Ill.

3 jobs at once

with *one* Tournapull

Partner W. P. Bouler, Mobile, Alabama, estimates sideboarded "D" often carries 7 loose yards of clay . . . in higher-void dirt, probably averages 5½ to 6 yards.

▲ "D" shaped backslopes while grading roads around the subdivision. Making thin cuts about 150 ft. long, Tournapull consistently loaded in about 1 minute with help of 90 hp pusher.

Speed and mobility of their 7 yd., 28 mph "D" enabled Williams & Bouler, Mobile, Alabama, to maintain continuous production on jobs 12 miles apart. Here are the jobs:

1 Move 50,000 cubic yards of clay for Mauvilla Forest Estates Subdivision in Chickasaw, a suburb of Mobile. Job included leveling area, and grading 1½ miles of rough roads.

2 Move 15,000 cubic yards of sand on housing project nearby.

3 Assist in construction of 3 miles of highway known locally as "the Snow Road."

All 3 jobs done at same time, with "D" traveling to job No. 2 and job No. 3 whenever clay at Mauvilla got too wet from rain or whenever dirtmoving got well ahead of schedule. "D's" ability to travel fast over main highways was especially important, because one of its assignments, the Snow Road job, was 12 miles from the housing sites.

2000′ cycle every 3½ minutes

High speed paid off in high output, too. Engineer's time studies made on the Chickasaw housing site show the "D" completed typical 2000′ cycles every 3½ minutes (this included time to spread around trees left standing to beautify some of the housing sites). Loads in the heavy clay varied from 5½ to 6 pay yards. Output averaged 15 trips (82 to 90 pay yards) per 55-minute hour. This performance enabled the "D", working part-time, to move half the total yardage, while a larger crawler-scraper team, working full-time, handled the other half. Had both machines worked full-time on this one job, Partner W. P. Bouler estimates the D Tournapull would have moved "2 to 3 times as much dirt as the crawler and pan!"

See for yourself how this high-speed, versatile Tournapull can put profits into *your* scattered jobs, either as a self or pusher-loaded tool. Call today to arrange time and place for a demonstration. No obligation, of course.

Despite need to maneuver around trees, Tournapull completes typical 2000′ cycles every 3½ minutes. ▼

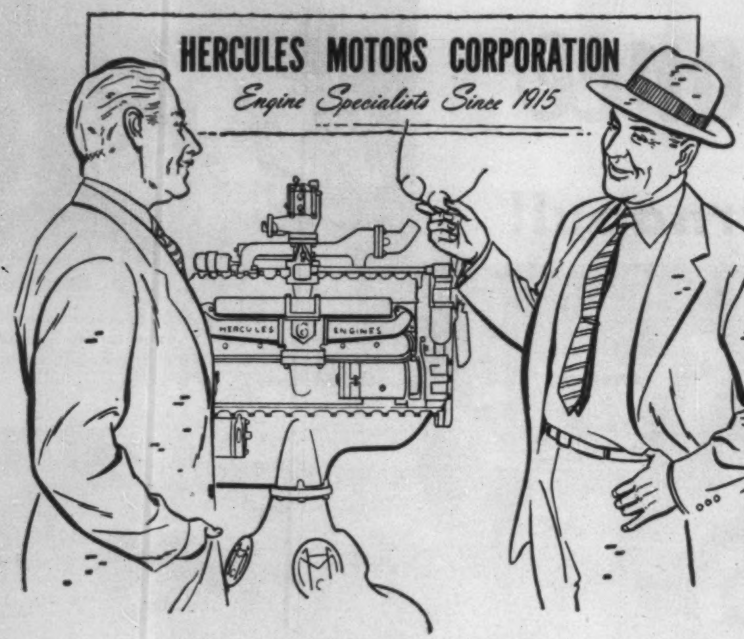
Tournapull—Trademark Reg. U.S. Pat. Off. DP-803-H-b

LeT

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



It May Cost a Little More to Buy the Best
But HERCULES ENGINES give you
So Much More for your money.

● (1) Long-life service . . . not just an idle statement. Many HERCULES ENGINES 5, 10, and 15 years old are still delivering dependable day-in, day-out power. (2) Engines designed to-the-application . . . granted, we have over 90 standard models but they are not off-the-shelf items. HERCULES ENGINES are custom-produced to specifications of the equipment. (3) Gasoline or Diesel . . . many models of gasoline engines have similar mounting dimensions as diesel engines of like displacement. (4) Wide selection of fuels . . . HERCULES ENGINES operate efficiently on any popular fuel available, permitting the use of the most economical fuel in your area . . . gasoline, diesel fuel, natural gas, kerosene, L.P.G. and others. (5) Lightweight, heavy-duty construction . . . the excess metal that adds to engine weight has been eliminated . . . all 6 cyl. engines have 7 bearing Tocco hardened crankshafts, large precision-type bearings and full length water jackets are some of the extras which are standard on HERCULES ENGINES.

These are but a few of the features that make HERCULES ENGINES a better buy. For more complete information on the wide selection of Hercules Engines and Power Units, write for a copy of the folder, "Hercules Engines." This lists the many sizes of engines and their power ratings.

HERCULES ENGINES
HERCULES MOTORS CORPORATION
40 Years of Engines for Industry
129 Eleventh Street, S. E. • Canton, Ohio

PUBLICATIONS

• **Mechanical Joint Pipe and Fittings**—A new 32-page booklet entitled "Warren-Spun Mechanical Joint Pipe and Fittings" provides detailed methods of installation, standard dimensions, thicknesses and weights and a table of standard sizes, classes, thicknesses and weights of mechanical joint pipes available from the company.

Step by step photos show the method of installation while following pages describe this operation textually. Included in this section are instructions for preparation, bolt torque data and tightening the joints.

Four pages of the booklet are devoted to standard specifications while another two pages describe in tabular form the pipe available.

Also included are drawings and tables of sizes for such accessory items as bends, tees and crosses, reducers, offsets, sleeves, connecting pieces, glands, plugs and caps, drip pots, gaskets and bolts and nuts.—WARREN FOUNDRY & PIPE CORP, 55 LIBERTY ST., NEW YORK 5, N. Y.

• **Concrete Masonry** – Two booklets are available for those interested in concrete masonry and its applications.

One, entitled "Concrete Masonry Comes of Age", was written by Mr. William M. Avery, editor of Concrete. This presentation is liberally illustrated and begins with a general introduction followed by description of the concrete masonry products available. Homes of concrete masonry are broadly described and included in this section are items pertaining to the strength and durability, fire resistance, insulation value and economical considerations of concrete masonry. This booklet is offered by the BESSER CO., ALPENA, MICH.

The second booklet is entitled "Beautiful Walls with Concrete Masonry". This publication is liberally splashed with color illustrations and contains brief descriptions of each installation. This 16-pager is published by the PORTLAND CEMENT ASSN., 33 W. GRAND AVE., CHICAGO 10, ILL.

• **Drill Bits**–A general catalog covers the line of Hoffman "oriented diamond" drill bits. Diamonds in the crowns of these bits are set at predetermined angles to expose the hardest, sharpest cutting surfaces to produce bits that are said to cut faster and last longer.

The catalog lists sizes, setting charges, weights, uses, etc. for all standard bits. Among the items described and priced in the booklet are

3 big capacity "C" Rear-Dumps handle tough rock haul

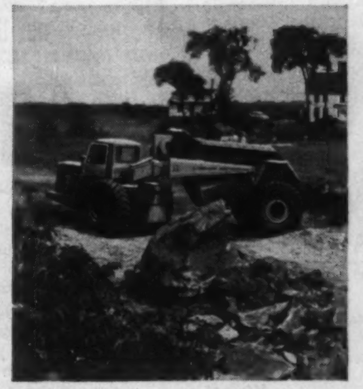
One of the toughest problems Wes-Julian Construction Corp., Dedham, Mass., encountered on improvement of Hanscom Air Force Base near historic Lexington was removal of a 100,000-yd. mound of solid granite known as Mew Hill. Located near the junction of the existing runway and the proposed extension, this hill posed a serious danger to jet planes using the strip. It also blocked construction of parking areas and prevented direct access to the field from machine and repair shops. Having successfully used Tournapulls on scraper dirt for several years, contractors turned to LeTourneau-Westinghouse equipment to solve this problem, too. Haulers chosen were 3 C Tournapull Rear-Dumps.

Solving a rock hill problem on $3,885,000 Air Base job

Rear-Dumps usually were loaded in 4 to 5 passes of 2½-yd. Northwest shovel. Each load averaged 18 tons. Because one "C" carried as much as could 3 to 4 average dump trucks, often used on jobs like this, Wes-Julian needed fewer haulers and fewer operators. All-steel body construction also reduced maintenance. Capacity of this Model "C" Rear-Dump, without sideboards, is 18 tons. Newest "C's" carry 22 tons.

Leaving the shovel, these Rear-Dumps accelerate quickly ... go rapidly over both well-maintained haul road and soft fill. Runway is being extended 2300'. Pavement will be 200' wide with 200' shoulders on either side. Several 75' wide taxiways to be constructed include one 1000' long and another 1500' long. At the eastern end of the 150 acre air field job, Wes-Julian will also construct a 250' long blast pad.

Fill is dumped at end of runway extension. Note how body swings below and behind rear wheels. This keeps material from piling under unit ... combined with front-wheel drive, allows safe dump over edge of fill or steep banks when necessary. When Mew Hill has been leveled, Rear-Dumps will haul another 100,000 yds. of rock, hardpan, peat, and clay from other borrow locations to grade for 6 miles of connecting highways.



Turning to dump in tight quarters of this ditch is no problem for C Tournapull Rear-Dump. Despite overall length of 29', "C's" can make non-stop 180° turn in space only 27' wide. In dump position, this remarkable unit requires only 21' for a non-stop U-turn. Steer works independently of footing through geared kingpin that connects trailing unit with prime-mover.

Tournapull—Trademark
Reg. U.S. Pat. Off. R-746 H-b

For more information on Tournapull Rear-Dumps (or interchangeable scrapers and bottom-dumps) please write or call:

LeTourneau-Westinghouse Company
PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

The man behind the gun will tell you . . .

WHITE GIVES YOU

greater, longer-lasting precision—

Shown, model 7014 with "A" standard. Sold complete with tripod case and field equipment. Model 7020, same unit with "U" standard, also available.

. . . yet costs less than other quality engineers' transits

LIKE every White quality-built instrument, these engineers' transits give you greater dollar-for-dollar value than any other comparable unit.

For example: White uses a recently-developed Swiss Dividing Engine to cut graduations into solid silver. This insures super-precision from the beginning, safeguards it through more years of hard field usage.

In addition, White engineers' transits give you internal focusing, covered leveling screws, and coated optics. These and a host of other design and operating features combine to give you a transit unsurpassed for ease, speed, accuracy, economy and long-lived dependability. Write for Bulletin 155 and the name of your nearest dealer. DAVID WHITE COMPANY, 317 W. Court Street, Milwaukee 12, Wisconsin.

White Coated Optics give you an image like this . . .

not this

Even at long distances under adverse weather conditions, you get a clear, sharp image — without halation.

DAVID WHITE COMPANY

We offer expert REPAIR SERVICE on all makes, all types of instruments.

concave and pilot bits, tapered step-type non-coring bits reaming shells and laboratory or thin faced bits. HOFFMAN BROS DRILLING CO, PUNXSUTAWNEY, PA.

• **Aluminum Bridge Railings**—In this book 52 pages are used to show designs which use aluminum most efficiently—designs that require the minimum amount of material and work, yet provide the maximum in strength, rigidity, and pleasing appearance.

Updated from last year's version, the 1955 issue contains an entirely new section devoted to associated highway accessories. Among recent developments in this field are standard aluminum blanks for highway route signs and markers. Another development is the use of aluminum honeycomb panels with a core of resin impregnated Kraft paper for light yet rigid panels for large signs marking exits, entrances, towns and distances.

The newest development is an extruded aluminum interlocking sign panel which can be assembled to any size desired by using standard elements in 6 or 12-in. widths, available in lengths up to 30 ft. The panels are attached to supporting posts by hooks or J-bolts without drilling holes in extruded elements.

Another feature of the 1955 edition is that reference and mill die numbers are listed along with all extruded shapes for ready identification.

The book includes a study of architectural considerations, complete design details, recommendations for joints, endings and post settings, surface treatment and insulation. Bridge railings in use are presented in detail with diagrams to show joining and mounting methods, cross sections of shapes employed with a full bill of materials required per section of railing.

The design studies include a structural analysis of a typical railing as well as information for calculating deflection and impact values. A table compares aluminum railings with steel under impact loadings within the elastic limit.

Other tables in the new manual present data on allowable unit stresses for various aluminum alloys for railings and posts, for bolts and nuts and for welded connections; mechanical properties of aluminum alloys for structural rail members. The new aluminum alloy designation system is used throughout the book.

Cost studies show weight per running foot and comparative cost for

(*Continued on page 275*)

65,000 yds. of clay and sand per week

for 3 "C" Tournapulls

To speed relocation of 13 miles of State Highway 25 north of Howard, South Dakota, Pasco Construction Company, Sioux Falls, assigned 3 C Tournapulls 95% of all dirtmoving.

According to Owner Owen Pasco, the 3 "C's" moved a combined total of 65,000 pay yds. per 120-hour week on hauls averaging 800 to 1000 ft.

At this production rate, Pasco finished 500,000-yard job in 2 months.

Timed by field engineers on one 2400′ cycle, each of the 3 Tournapulls averaged a cycle every 3.75 minutes. Despite soft footing which made for tough going in borrow pit, load time varied from .75 to 1.0 minutes for 13 pay yards of sand and clay. Combined output for the 3 units was 40 loads (520 pay yards) per 50-minute hour.

1,500,000 yards per season

Says Pasco, "Our 'C's' did a very good job for us. We had no trouble to speak of. I don't think there is anything that can compare with our LeTourneau-Westinghouse equipment. In one season, our 3 Tournapulls moved 1,500,000 cubic yards."

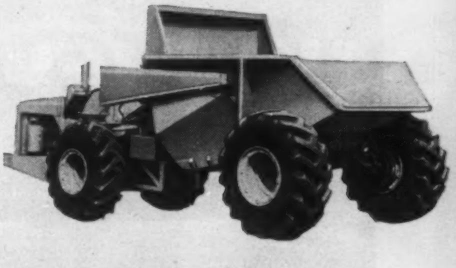
Adds Mechanic Ralph E. Durfee, "Our 'Pulls are giving us very good service. They operate very easy, and I can make repairs and adjustments in short order as it is so easy to get at the different units."

For all-round performance under a wide variety of conditions, it will pay you to investigate Tournapulls. Why not have a demonstration on *your work?* Call us to arrange time and place. There's no obligation.

Loads weighed on the job

Time study production given in this report is based on a conservative estimate of 13 pay yards per load. Yet, men on the job report that weight tests made several times by engineers from a competitive manufacturer shows Tournapulls regularly scaled payload of 16½ yds.

Tournapull spreads load in 17 seconds. Jobs previously handled by the "C's" include 400,000-yd. 4-mile contract on Highway 77 near Del Rapids, and 465,000-yd. 13-mile highway contract at Desmet. When moving job-to-job, Tournapulls tow large shop trailers. Units made the 80 miles from Desmet to Del Rapids in 4 hrs.



Insure your future

For less than 25% of the cost of the original unit, you can get an 18-ton Rear-Dump hauler to interchange with the Tournapull Scraper. You save money because all you need buy is the rear-dump body . . . rear wheels, tires, and brakes may be interchanged.

Tournapull—Trademark Reg. U.S. Pat. Off. P-582-H-b

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These Bucyrus-Erie Crane Features Help You On Every Phase of Building

Maximum Stability- A low center of gravity and long, wide-spread crawler units give Bucyrus-Erie cranes a firm footing for the safe handling of long booms. This kind of stability enables operators to work rapidly.

"Full-Feel" Control- Direct-connected controls give operator unequaled "feel" of the load. Big clutches are instantly responsive, smooth in action, provide utmost load-handling safety, let the operator "inch" load accurately up or down.

Independent Boom Hoist- Boom hoist on Bucyrus-Erie cranes is independent of all other functions . . . is available instantly for boom angle changes. Lowering speed is power-controlled.

Simple Jib Extension Connections- Jib extensions can be connected without removing sheaves, guards, suspension ropes or any of the boom-point machinery.

See your Bucyrus-Erie distributor for complete information on cranes with boom lengths up to 120 feet. Jib extensions are from 10' to 30' long. Crane capacities are variable depending on length of boom, size of crawler mounting, and counterweight used.

153E55

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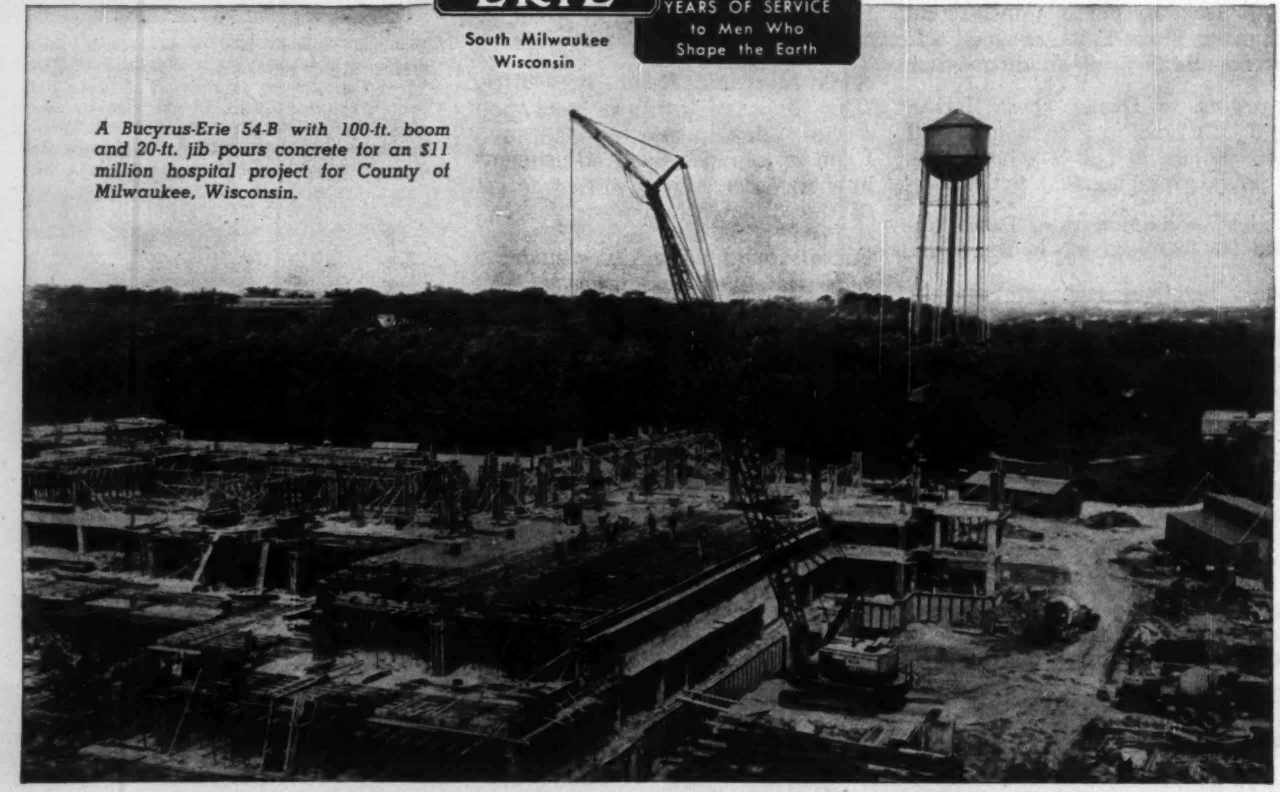

A Bucyrus-Erie 54-B with 100-ft. boom and 20-ft. jib pours concrete for an $11 million hospital project for County of Milwaukee, Wisconsin.

complete aluminum bridge railings of four typical designs detailed in the book. The section also includes comparative prices and properties of the extruded aluminum members.

Guide specifications presented in a separate section cover materials for cast posts and fittings, extrusions, fasteners, pipe, rods and bars, sheet and plate, drawn and extruded tube; their storage on the site, and their condition as to straightness and finish. Fabricating operations covered include bending, cutting, drilling and punching holes, reaming holes, drifting holes, riveting, bolting, welding and expanding. A chapter on all-aluminum lighting standards is also included. 117 illustrations and 23 tables are included. Desk PR, Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

- **Scales**–A 4-page folder describes the manufacturer's various types of suspension hopper scales which are used for mixing, proportioning or batching of various ingredients in many fields. Available in capacities from 500 to, and including, 100,000 lb, the units can be adapted for square, round or rectangular hoppers. Among the uses for the hopper scales is included the batching of concrete.

The scales are of all steel construction, featuring hardened steel pivots and bearings. According to the brochure, they can be equipped with dial indicators or with weigh beams as desired. The brochure describes and illustrates a variety of styles and sizes of scales used. The Webb Corp., Webb City, Mo.

- **Tables and Data**–A new booklet entitled "Selected Scientific and Engineering Tables and Data" contains selected chemical and physical, engineering, plastic, and other tables and charts arranged for easy reference.

Included in the chemical and physical section is a short glossary, tables of weights and measures, decimal equivalents, conversion tables, and composition and constants of fats and oils.

Under the engineering section are wire and sheet metal gages, weights of various materials, physical properties of metals, hardness scales, wire tables, steel pipe dimensions, air infiltration through windows, conductivity of insulation, electrical conductivity of metals, etc.

In the plastic section there is contained a plastics glossary and a table of properties. United States Testing Co., Inc., 1415 Park Ave., Hoboken, N. J.

one skyscraper coming up
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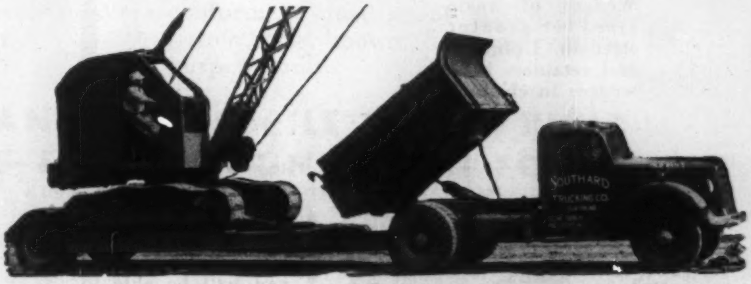

Attaching of loaded Rogers Tagalong trailer

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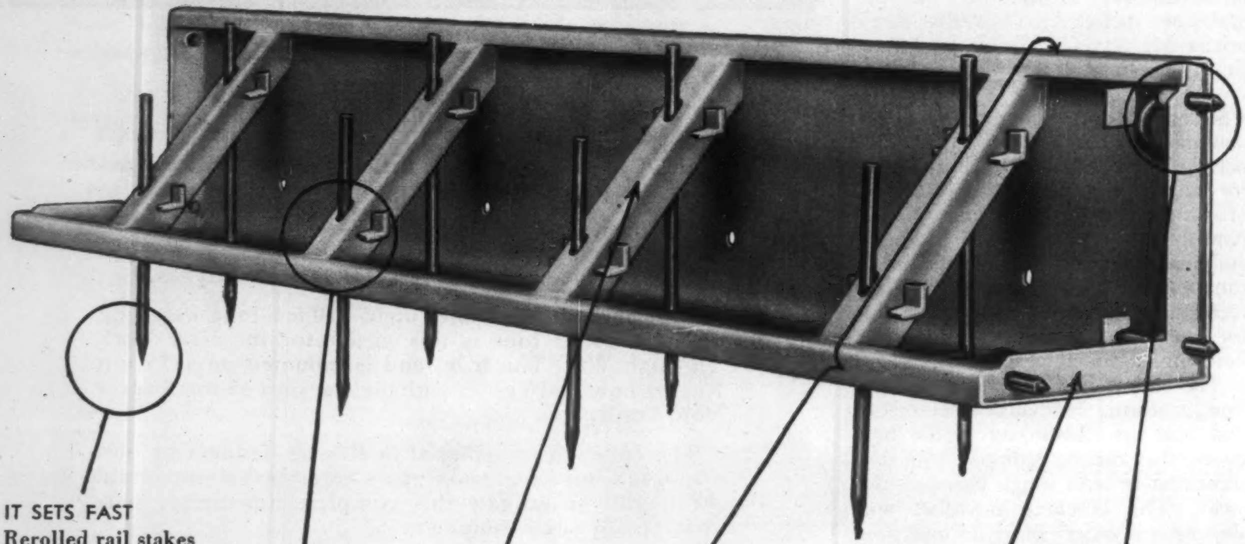

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Rerolled rail stakes with long points that will penetrate rock where necessary.

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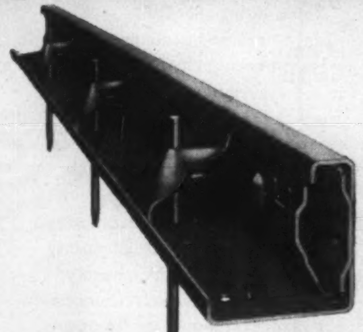

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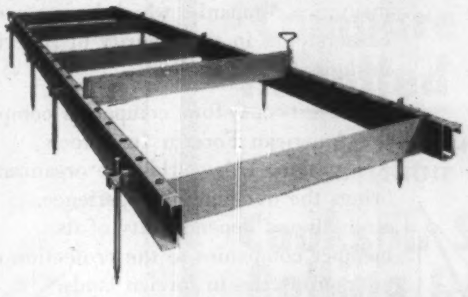

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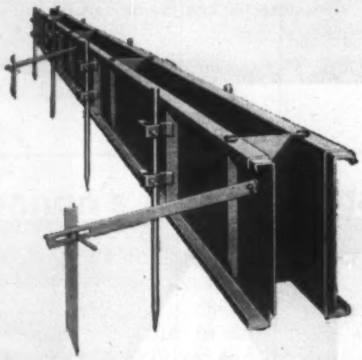

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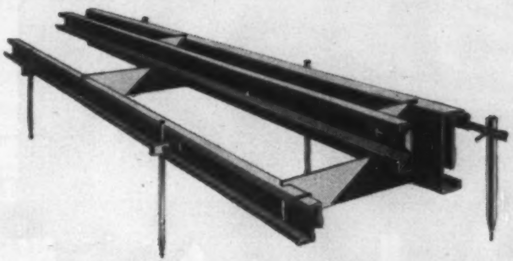

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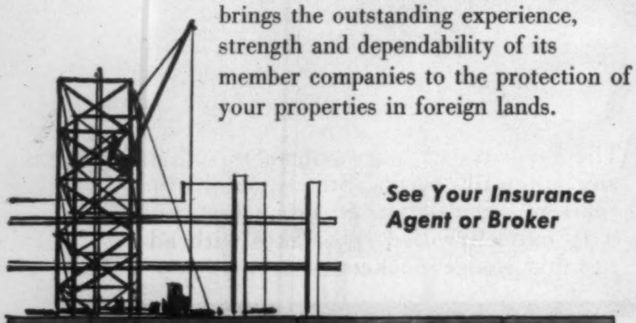

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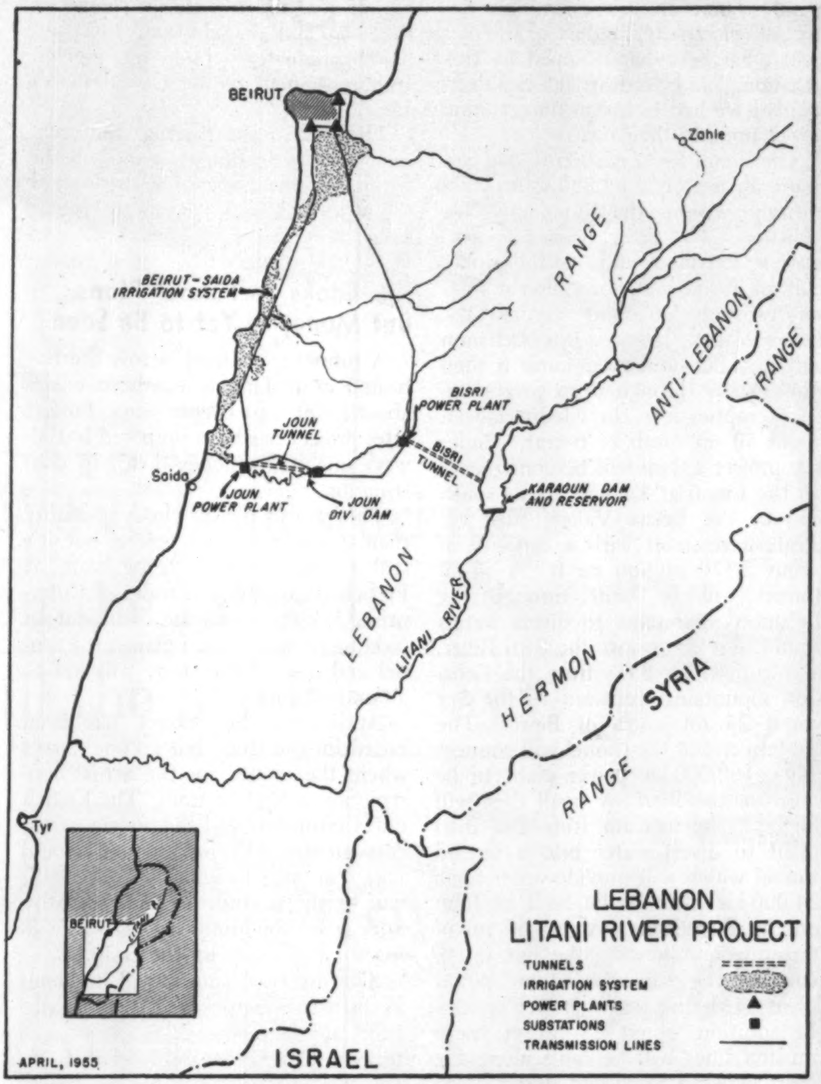
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APRIL, 1955
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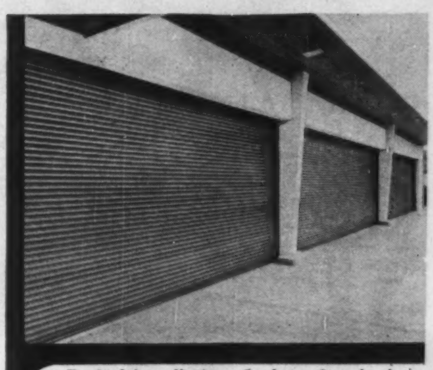
Lebanon's Hydro-Irrigation Scheme Backed by $27-Million from World Bank

The World Bank has made a loan of $27 million to assist in financing the construction of a power and irrigation project on the Litani River in Lebanon. The project will more than double present electric generating capacity in Lebanon and relieve the power shortage which has existed for the past ten years, particularly in the Beirut area. It will also permit the irrigation of 8,500 acres along the Mediterranean coast.

The loan was made to the Litani River Authority, an autonomous government agency established in 1954 to execute construction of the project. The Authority has retained engineering consultants to plan and supervise the project, and will itself manage and operate the power and irrigation works when they have been completed.

The Litani River and its tributaries are the largest of the undeveloped water resources in Lebanon. The development of the river basin was studied originally by technicians of the Lebanese Government and during 1951-54 a plan was drawn up by the U.S. Bureau of Reclamation as part of the technical assistance program for Lebanon. The project for which the loan was made is based on the Bureau's plan.

The main purpose of the project is to supply additional electric power in Lebanon. The existing power system is overloaded and has no reserve capacity; private investment in additional



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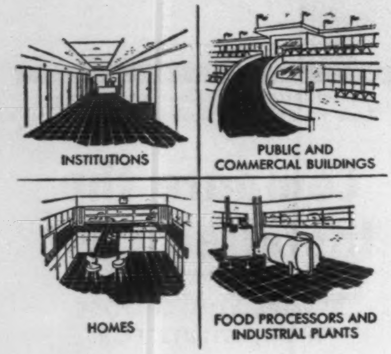
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power capacity has been insufficient to meet the rapidly expanding demand. There are restrictions on the use of electricity; industry in particular has been handicapped by this situation, and industrial establishments have had to install uneconomic power units of their own.

The Litani River is 106 mi long and drains an area of about 860 sq mi lying entirely within the boundaries of Lebanon. The river rises in northeastern Lebanon and in the upper half of its course flows slowly in a southwesterly direction through the Bekaa Valley, between the Lebanon and Anti-Lebanon mountains; it then runs swiftly through deep gorges until it empties into the Mediterranean about 50 mi south of Beirut. Under the project a dam will be constructed on the Litani at Karaon, at the south end of the Bekaa Valley; this will create a reservoir with a capacity of about 2,120 million cu ft. A 5½-mi tunnel will be built through the Lebanon mountains to divert waters from the reservoir into the Bisri River, a stream which flows from the Lebanon mountains westward to the Sea about 25 mi south of Beirut. The western end of the tunnel will connect with a 60,000-kw power plant to be built on the Bisri. A small dam will be built downstream from the Bisri plant to divert water into a second tunnel which will provide water for a 24,000-kw plant to be built at Joun on the Bisri River. About 60 mi of transmission lines will be put up to connect the Bisri and Joun power plants with the Beirut power system. In addition, about 25 mi of transmission lines will be built along the coast between Saida and Beirut.

The irrigation system will be located on a narrow coastal strip running south of Beirut to Saida. The system to be built will use water from the Karaon reservoir directed through the tunnels and canals to the headworks of the Joun power plant, where it will enter the main irrigation canal. This canal will be 35 mi long, reaching to the suburbs of Beirut.

The project is scheduled for completion in 1961, and total cost is estimated at the equivalent of about $40 million. The Bank's loan of $27 million will be used to pay for the services of foreign consultants and contractors and for imports of power generation equipment, transmission lines and substations, construction equipment and some construction materials and supplies.

The local currency requirements equivalent to about $13 million will be provided by the Government in the form of interest-free advances. The earnings of the power system should be sufficient to cover service charges of the loan and, in addition, have surpluses adequate to build up reserves, after repayment of the Government's advances.

The cost of constructing and operating the irrigation system will be covered from charges for the use of the water and from land improvement taxes.

Rio Looks to Tunnel Plans But Money Is Yet to Be Seen

A tunnel to Niteroi, across the bav from Rio de Janiero, has been talked about for at least twenty years. Project after project has been proposed but always one item—money—held up construction.

The project is now closer to reality than it has ever been before, but it's still a long way from being built. A French organization, Etudes et Enterprises Societe Anonyme, won out in bidding to make initial plans for a tunnel and cost of the study will run to around $1-million.

Apparently, the money has been raised for the study but no one knows where the money for the actual construction will come from. The French outfit estimated that the project would cost around $60 million and would take four years to build. EESA says it will finish its study in eight months, after which building can start—providing someone puts up the cash.

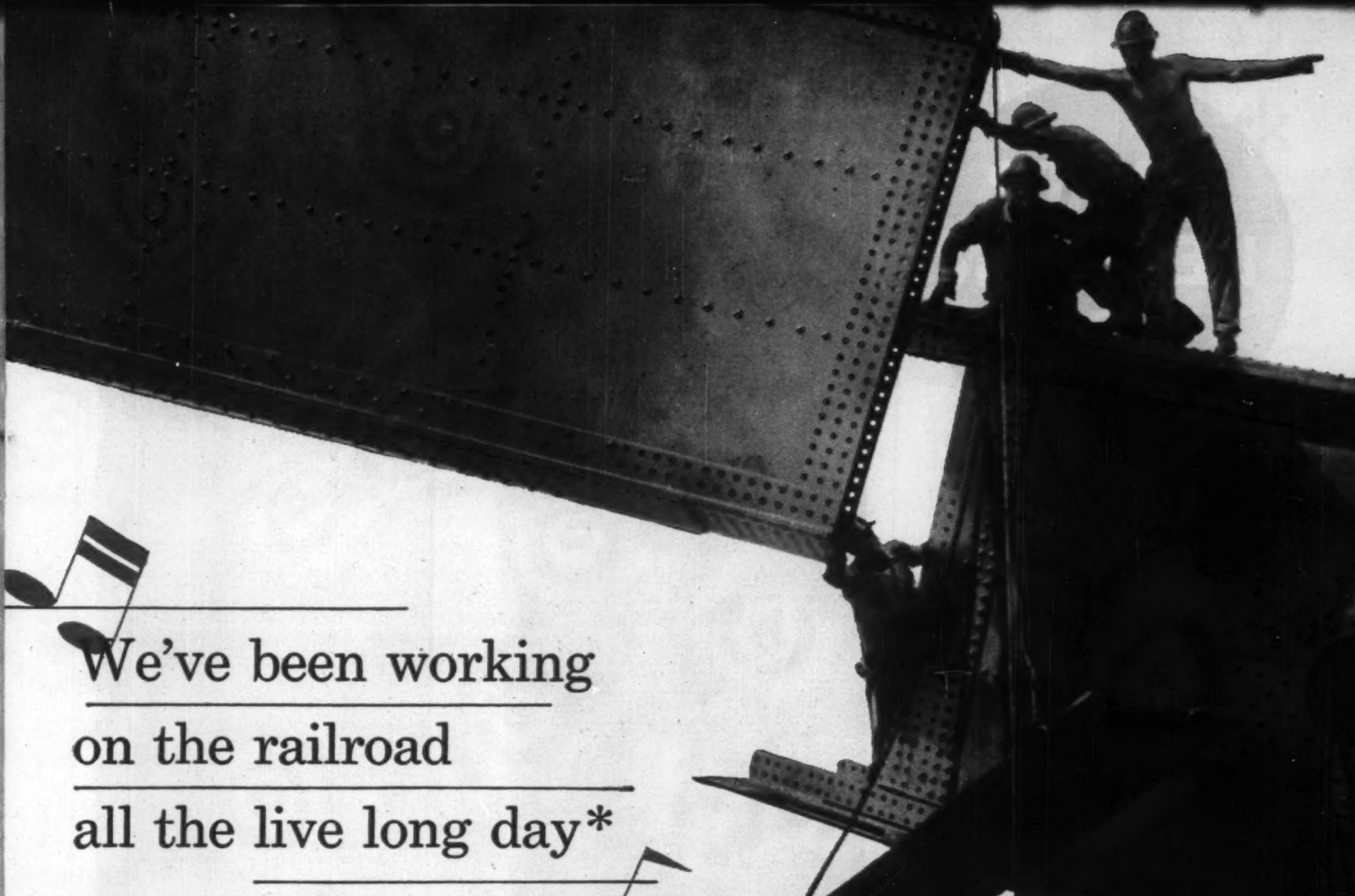
The proposed tunnel will be about 1⅞ mi long composed of two parallel tubes approximately 21 ft in dia. The tubes will lie at a depth of 230 ft below the bottom of the bay.

Investigations Begun for Sweden to Denmark Bridge

Seismic investigations of the bottom of Oresund, the sound between Copenhagen and Malmo, Sweden, have been started as a basis for planning a bridge between Sweden and Denmark.

Several projects for a bridge over the Sound have been proposed, but so far no action has been taken. It is possible that the next session of the Swedish and Danish parliaments will see a bill started, which would then go through committee study for a number of years.

The last proposed project called for a bridge over the shortest open water in the vicinity of Copenhagen-Malmo. This distance is 11 mi and ends at the southern tip of an island outside Copenhagen.



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Fifty-five years of building railroad bridges is some record, isn't it? In fact, there aren't many veteran railroaders who have spent more time on the job than American Bridge!

And, believe us, we have learned a lot about the engineering and maintenance problems of the "roads" over the years.

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If your system is one of the many we have served, you know our work. *You know how completely dependable we are.* If, on the other hand, you have never enjoyed the satisfying relief of having American Bridge handle your bridge building problems, we suggest that you *make a note now* to discuss your needs with us whenever they arise.

If, as they say, railroading gets in your blood, then American Bridge must surely be saturated with it. For there has seldom been a day when we have not been working on a railroad project somewhere.

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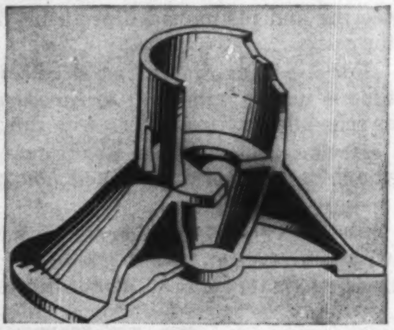
TURRET is located atop the 446-ft concrete tower. Antenna will be added later.

Thin-Shelled TV Tower Rises 702 ft.

A new landmark for Stuttgart, Ger., a 702-ft high television tower will soon have its finishing touches applied. The main part of the tower is a tapered concrete cylinder measuring 446 ft in length. Atop the cylinder is perched a turret which will house a restaurant and further up will be a 184-ft antenna.

The outside diameter of the concrete section at ground level is 35.4 ft while at the base of the turret it is 16½ ft. Thickness of the wall is 23.6 in. at the bottom, 11.8 in. at a height of 33 ft and decreases gradually to 7.1 in. at the top. This relatively thin wall is strengthened by diaphragms spaced at vertical intervals of 33 ft. These diaphragms also support five concrete columns running the length of the tower to which guide rails for the elevators are attached.

The tower rests on two cones—one inverted and placed inside the other. The outer cone consists of a base ring with an outside diameter of 88½ ft and inside diameter of 67.2 ft. Up-



OUTER RING of foundation cone is 88½ ft across. Through 112 radially arranged cables it supports the weight of the tower.

Better bladework with no clutchwork

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That means one less control for the operator—means he can concentrate on his bladework, make faster passes and smoother cuts.

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And it lengthens the life of all grader components because the TORQMATIC Converter absorbs harmful shock loads—boosts engine life by preventing engine lugging or stalling.

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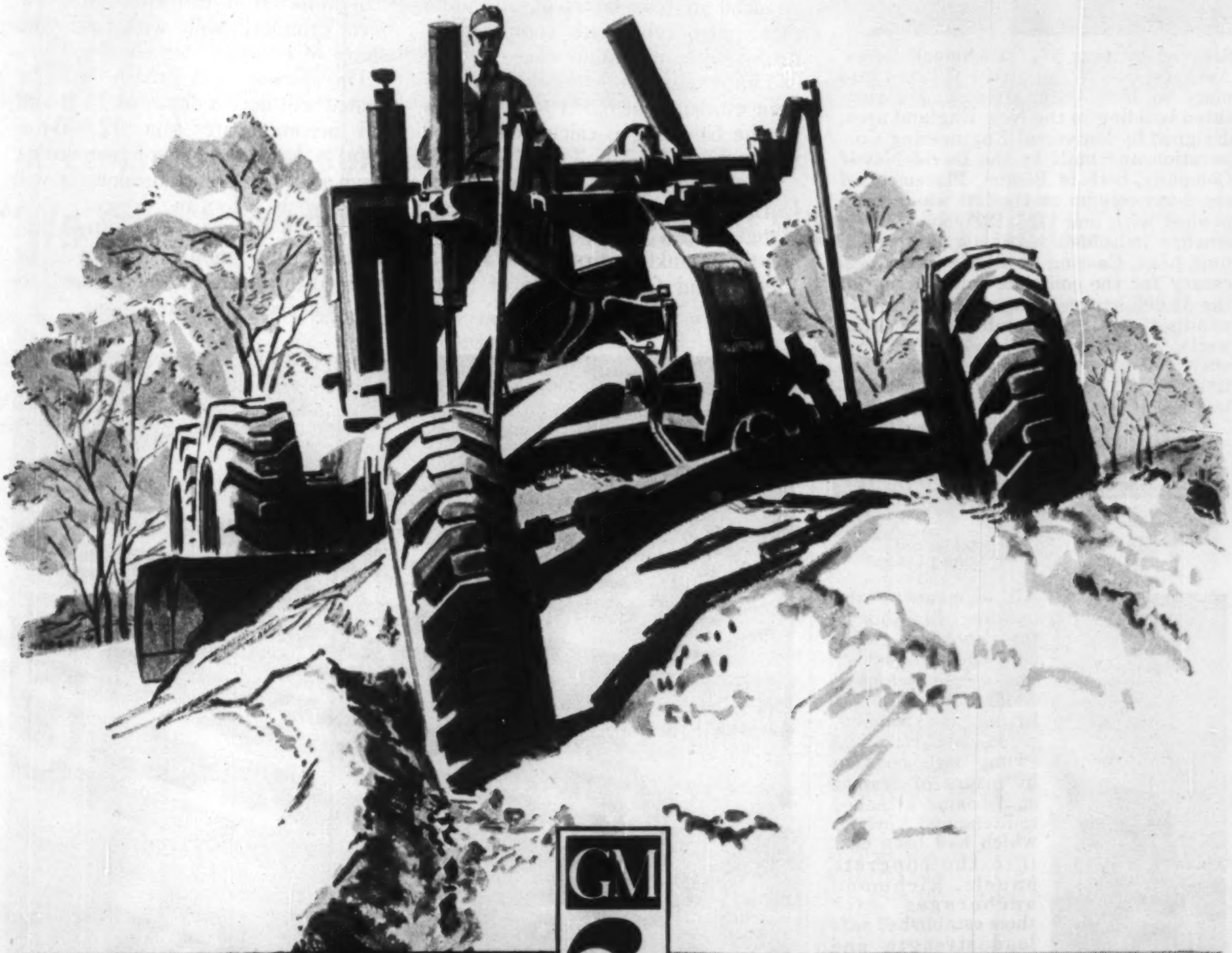
You can get Allison TORQMATIC Converters for both gasoline or Diesel engines from 40 to 400 horsepower—TORQMATIC Transmissions for applications up to 300 horsepower. Get full details on Allison TORQMATIC DRIVES for the equipment you buy or build by writing Allison Division of General Motors, Box 894E, Indianapolis 6, Indiana.



GM

TORQMATIC

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TORQMATIC DRIVES

wards from this ring, the walls of the outer cone extend. Tapered, they are 11.8 in. thick at the base ring and 23.6 in. thick at the bottom of the tower. The inner cone shell has a wall thickness of 11.8 in. at the bottom of the tower and expands to 17.7 in. where it joins the 18-ft dia bottom plate. The upper plate—where the tower structure joins the cone foundation—is 35.4 ft in dia and 3.3 ft thick. Total thickness of the foundation is 26.9 ft.

The weight of the tower is transmitted to the base ring of the outer cone. Stretched across the diameter of the ring are 112 cables arranged in the manner of bicycle spokes. However, to prevent intersection in the middle of the circle, they are arranged in four layers of 28 cables each. The cables are composed of twelve wires 8 mm in dia.

The maximum vertical load has been estimated at 8,033 tons; tension on the base ring is calculated at 540 tons.

The tower, which was designed by Fritz Leonhardt of Stuttgart, is estimated to cost $160,000. Contractors are the Frankfurt firm of Wayes & Freytag and Gustav Epple of Stuttgart.

Salvador Plans $4 Million Port Structure at Acujutla

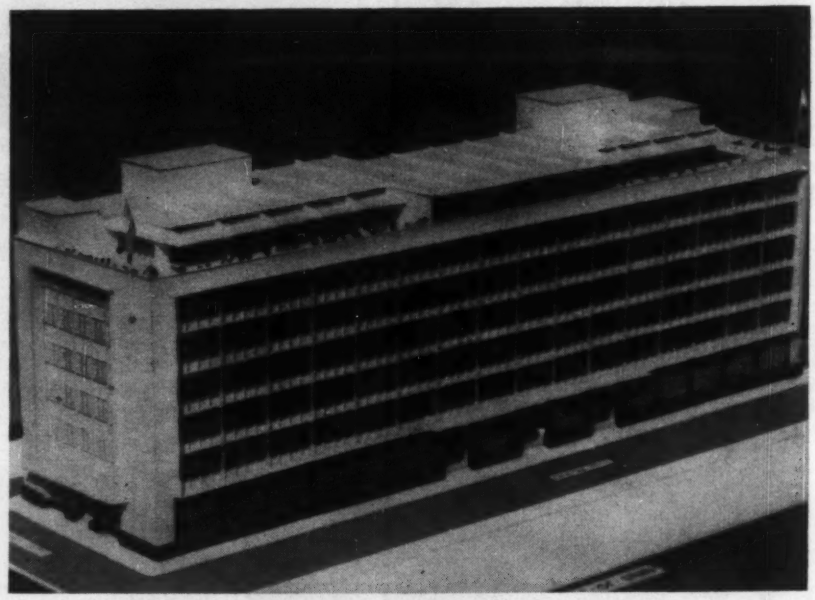
The government of El Salvador has approved the design of a $4 million dock-breakwater to be built at Acujutla on the Sonsonate River 50 mi from the capital.

The structure has been designed by the German firm of Deutsche Bergwerks and Huttenbau Gesellschaft, MBH. Previously the project had been proposed by United Nations engineers at a cost of $16 million. The German company was paid $98,000 for design work.

The dock will be 2,624 ft in length and curved at its outer end. The structure will rest on steel cylinders 39.4 to 46 ft in dia which will be filled with sand. It is estimated that the steel cylinders will withstand the effects of corrosion for about 60 yrs.

The harbor area which will be created will have a depth of 33 ft and will accommodate four 12,000-ton ships in fair weather and two during rough seas. The dock-breakwater will also serve as a desilting device.

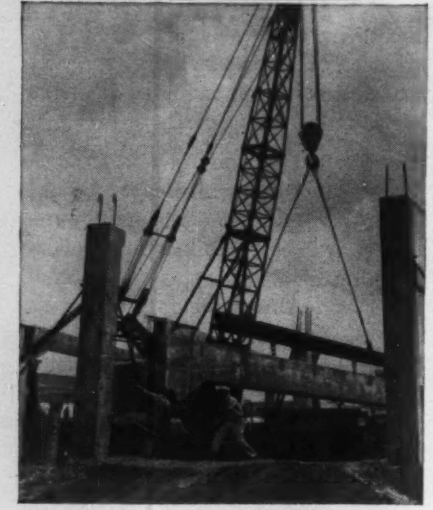
Bids will be called for construction within a few months and will be awarded three months later. Construction is expected to take 2½ yrs.



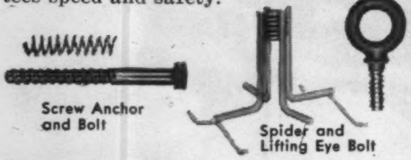
Office Block Planned for Trinidad

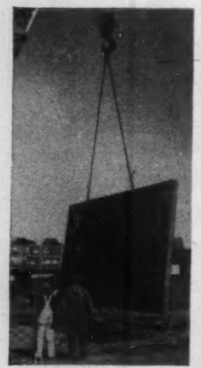
Plans for what is believed will be the largest government office building in the British Caribbean have been approved and working drawings are completed. The new office block in Port of Spain has been designed with six working floors and a cafeteria at roof level. It will be over 250 ft long, about 60 ft wide, and 95 ft high. Its six floors will give an area of over 66,000 sq ft. The building will be framed in reinforced concrete with reinforced concrete floors and roof. The scheme is expected to cost about $1½ million.

Pre-cast



Secured by four 1¼" Richmond Screw Anchors, this 25 ton girder is lifted into place in first fully pre-cast, prefabricated building in the New England area, designed by Universal Engineering Corporation and built by the David Nassif Company, both of Boston. Placement of the 8-ton column on the left was accomplished with one 1¼" Richmond Screw Anchor imbedded vertically in the column head. Casting of all the pieces necessary for the complete construction of the 51,000 square foot building through production-line assembly of pre-cast walls, panels, girders and beams took only six weeks. In all concrete construction work, Richmond equipment guarantees speed and safety.


Screw Anchor and Bolt
Spider and Lifting Eye Bolt



All segments of the building, like this 12 ton panel held in secure check by 4-1¼" and 4-¾" Richmond Spider Anchors for lifting and bracing, were cast flat and swung into position by means of frames or I-beams attached to Richmond Anchors which had been cast into the concrete panels. Richmond anchorages with their established safe load strength and absolute reliability are a natural for all such prefabricated concrete assemblies.

For more information and your copy of Richmond's 1955 Catalogue showing the complete line of Richmond products applicable to all types of concrete construction, write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 South 4th St., St. Joseph, Mo.

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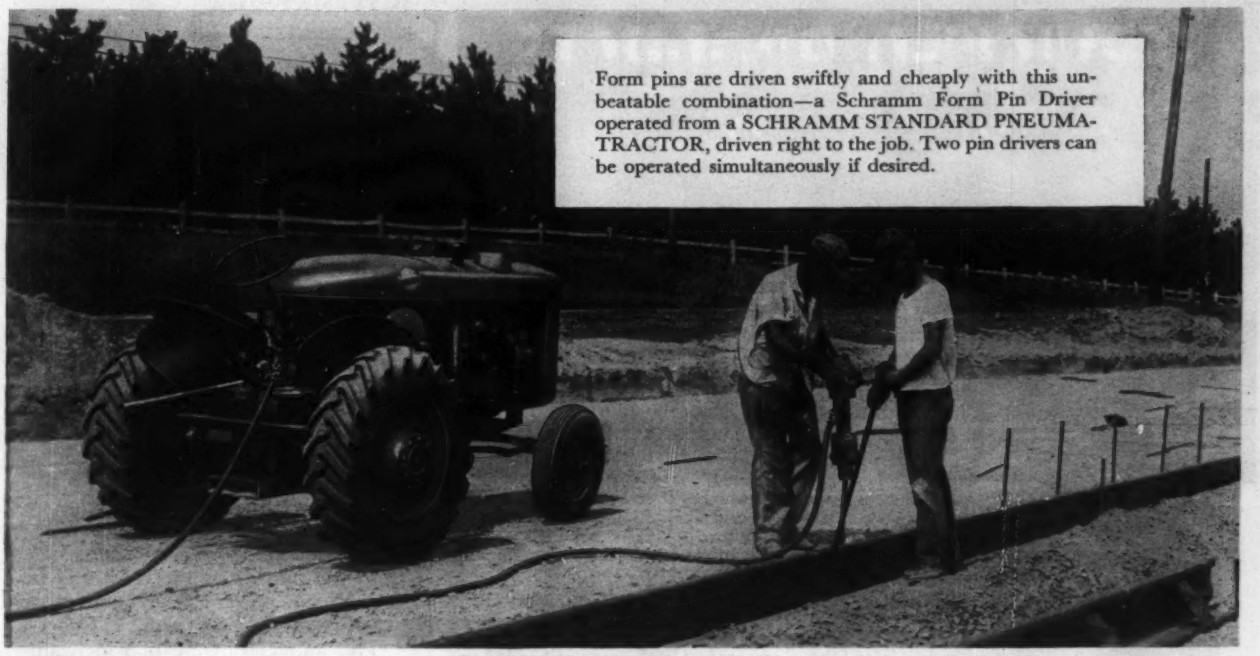


Form pins are driven swiftly and cheaply with this unbeatable combination—a Schramm Form Pin Driver operated from a SCHRAMM STANDARD PNEUMATRACTOR, driven right to the job. Two pin drivers can be operated simultaneously if desired.

A CONSTRUCTION SUPERINTENDENT REPORTS:

"We drive this complete air compression plant everywhere."

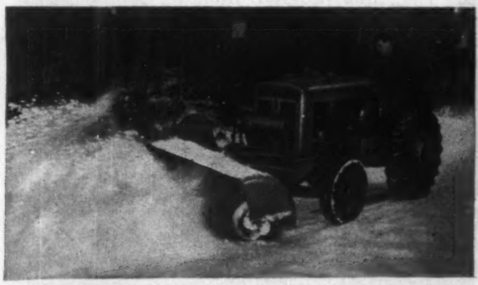
Putting compressed air to work on the job has never been easier or more economical. The operator merely climbs into the seat of his tractor type self-propelled air compressor and drives a *complete* air compressing plant right up to the job. No other equipment or labor is involved.

The outstanding example of this latest trend in portable air compression equipment is the *new* Schramm STANDARD PNEUMATRACTOR — a gasoline engine driven 125 c.f.m. air compressor with tractor features. It's a rugged machine, built to stand the daily abuse of construction or maintenance work. The STANDARD PNEUMATRACTOR can *push, pull, provide mechanical power and compressed air* for operating a variety of auxiliary equipment.

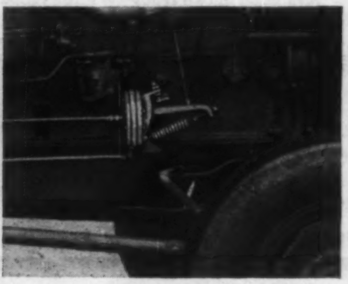
The cost of the STANDARD PNEUMATRACTOR is low; you get the use of a 125 c.f.m. air compressor *plus* a light tractor for less than the cost of many conventional two wheel mounted compressors alone. It's cheaper to operate and maintain, too. Any engine service man can service the PNEUMATRACTOR with very little instruction.

Complete details of this versatile machine are yours for the asking. Request Catalog 5545. Or ask your local Schramm dealer for a demonstration—he's listed in the Yellow Pages of your Telephone Directory.

Pneumajack, mounted on a STANDARD PNEUMATRACTOR, does a variety of jobs from drilling for mud jacking to production drilling.



Equipped with a Rotary Sweeper, the STANDARD PNEUMATRACTOR is ideal for sweeping leaves, dust, snow or light dirt. Hydraulic drive, controlled by operator, makes rotation of brush independent of speed of PNEUMATRACTOR.



The Pneumastat, a Schramm exclusive, automatically controls the speed of the engine and compressor in accordance with air demands, saves up to 50% of fuel costs.

Write for free informative booklet, "Piston vs. Rotary Air Compressors".

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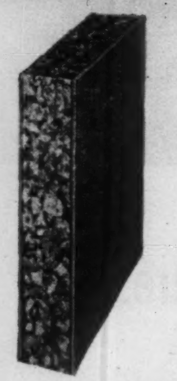
for Concrete Paving

The average concrete paving job, whether it be an airport runway, a city street, or a state highway or turnpike, requires the use of four groups of Servicised Products. The first of these is **AIR ENTRAINING AGENT** added to the concrete at the mixer to produce a more durable concrete.



◀ *Premolded Expansion Joint Fillers*

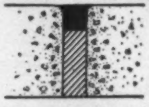
KORK-PAK — an exclusive Servicised development — is the all-purpose concrete paving joint filler. Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt saturated paper. **KORK-PAK** is the *lowest cost non-extruding joint filler on the market*. **KORK-PAK** recovers more than 80% of original thickness after compression, and has a very low rate of moisture absorption. Available in ¼", ⅜", ½", ¾", and 1" thicknesses and standard lengths of 5 or 10 ft. Longer lengths available on special order. The Servicised premolded joint filler line also includes Asphalt, Cork, Self-Expanding Cork, and Sponge Rubber types, as well as Longitudinal Tongue and Groove Joint and premolded Dummy Contraction Joint.

***Joint Sealers* ▶**

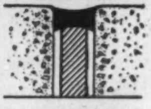
Para-Plastic Hot-Poured Joint Sealer is an extremely stable rubberized asphalt compound that forms a resilient, adhesive and effective seal — keeping the joint completely protected under any and all conditions of temperature, moisture and traffic. Para-Plastic is pumped directly into the joint from the melting kettle.

Para-Plastic JF for airport paving has the sealing characteristics of the standard compound, but in addition is impervious to solvents and jet fuel spillage.

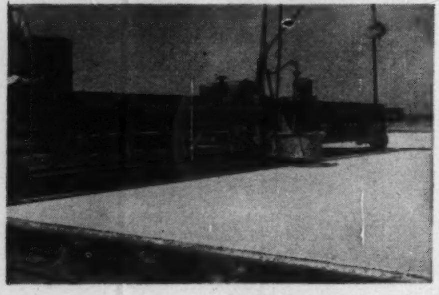
SERVITITE Cold-Applied Joint Sealer is a bituminous rubber sealer so compounded that it can be pumped cold from the drum in which it is shipped directly into the joint to be sealed.



Joints compressed in warm weather temperatures



Joints opened in subzero temperatures



◀ *Membrane Curing Compounds*

Available in two types—White Pigmented and Clear. Sprayed or painted on concrete, they form a uniform, moisture-retaining membrane to insure proper curing. Pigmented type reflects heat, reducing temperatures as much as 15°; Clear type, available with fugitive dye to assist in getting uniform coverage is used indoors or where natural color of the concrete must be retained.

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INTERNATIONAL

Longest Submersible Bridge Under Construction in India

Work has started on what is thought to be the longest submersible bridge in the world—the crossing of the Bombay-Agra highway in Madhya Bharat, North Central India.

The 2,434-ft bridge will have a superstructure of nine reinforced concrete parabolic arches over the deepest portion of the Chambal River and will be flanked by 200-ft long reinforced concrete rigid frame units—three on one side and four on the other. Four spans of 143 ft and five spans of 110 ft have been provided in the arched portion. There will also be semi-barrel and elliptical arches in the spandrel portion between two arches but these will not be visible from the outside as the faces will be covered to prevent logs and other debris from clogging them.

The foundations are of widely differing types since the river bed consists partly of rock in slope and partly of clay overlying rock formations. The piers for the arches will rest on cylindrical concrete shell foundations sunk to rock level up to a maximum of 70 ft; solid concrete cylinders will be used in the perennial stretches of the river.

Over the perennial section the level of the highway is 90 ft above the bed level. Although the average high flood level observed is 24 ft below this, maximum high flood level has reached 27 ft above the road level. The bridge has, therefore, been designed to withstand stresses during submersion under 27 ft of flood water.

Kuwait Moves to Spend $280 Million on Expansion

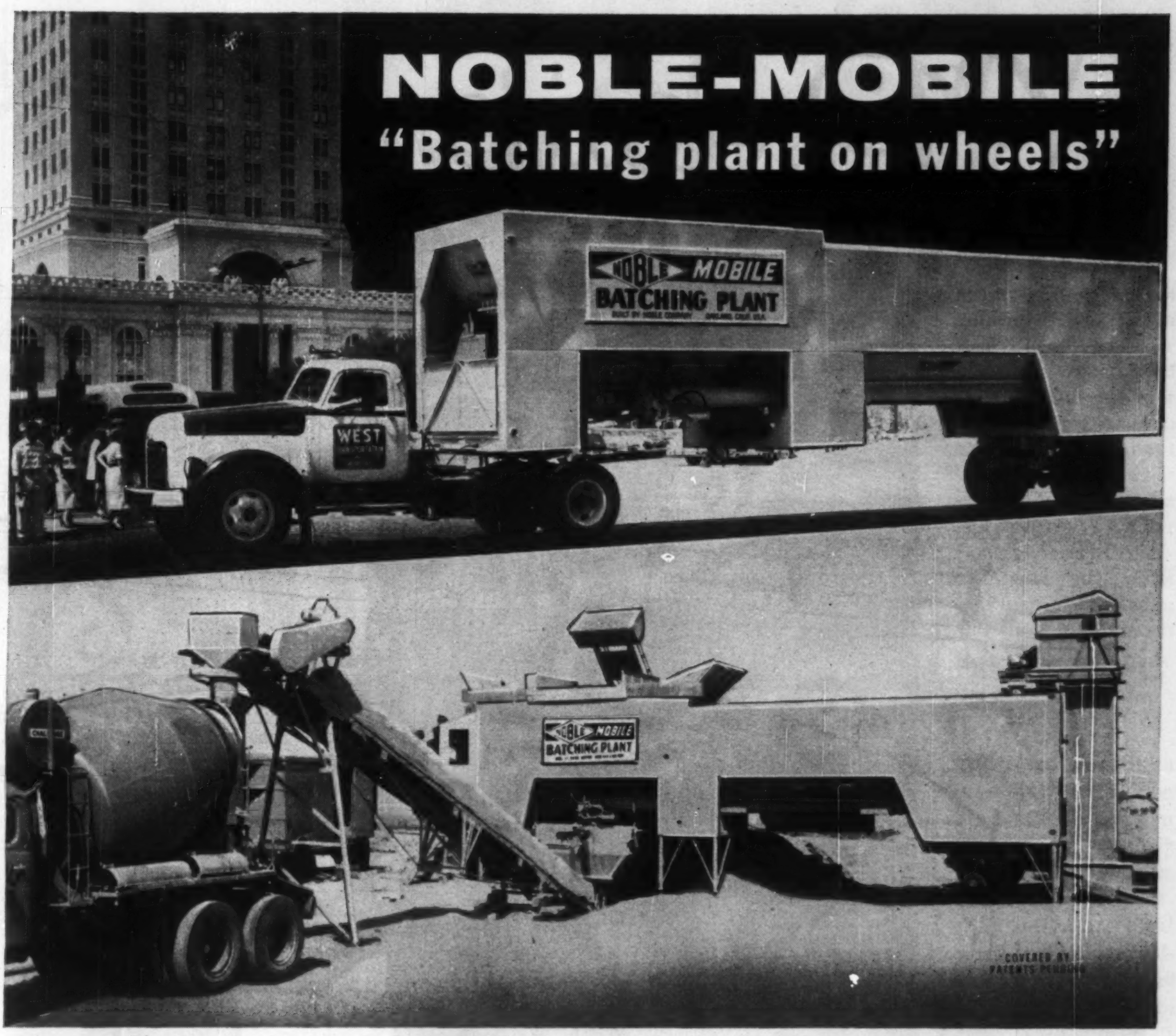
The tiny principality of Kuwait—with a population of about 150,000—will soon launch a vast economic development program costing about $280,000,000.

The program includes several plans ranging from irrigation to electrification and also construction of schools, hospitals and highways. All will be financed by revenues which Kuwait receives from petroleum.

Leopoldville's New Airport Has World's Longest Runway

A new airport under construction near Leopoldville, Belgian Congo, will have what is reported to be the world's longest runway. Stretching for 15,420 ft, the new installation will surpass by 1,420 ft the runway at the U. S. airbase in Ben Guerir, Morocco.

NOBLE-MOBILE
"Batching plant on wheels"

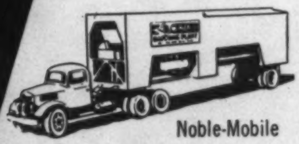


the complete plant that saves erection costs... drive it to the job site and start batching!

Noble-Mobile lets you batch at the job site proper where shorter hauls result in greater capacity. You go quickly into production . . . no footings, crane or electrical wiring required.

Noble-Mobile utilizes bulk cement. Aggregates charged with scooploader, conveyor or clamshell. 60 yards per hour or more output to truck mixers. Noble-Mobile drives the highways within legal limits. No special permit required.

NOBLE BATCHING PLANTS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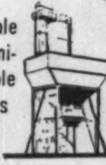
plants



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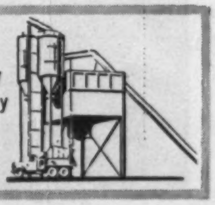

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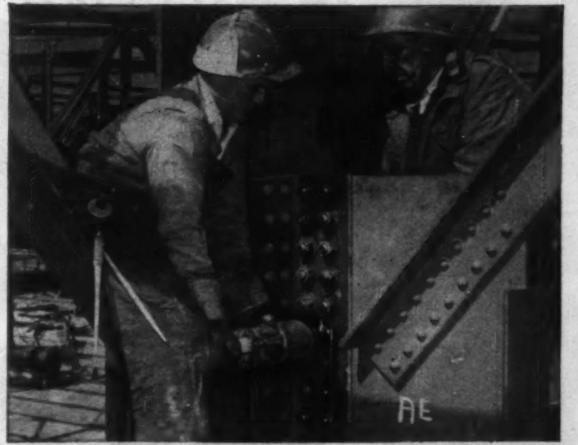
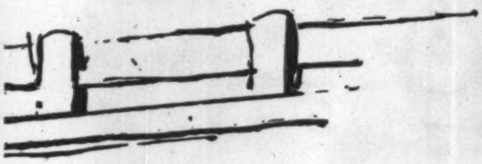
"Right on the job"



RIGHT For High Strength Bolting — High strength steel bolts afford greater clamping force and stronger joints than ever before possible. And you can make permanent bolted connections or pre-bolt faster, quieter and safer with a CP Air Impact Wrench! Available with side, pistol grip or straight handles and angle head models for hard-to-reach spots.



⬆ RIGHT For Your Tamping Needs — One man using this Super Triplex Backfill Tamper can do the work of five men using single tampers. It has wheelbarrow handles that make it easy to guide over the work — gets more uniform compaction. The Triplex affords more efficient distribution of manpower...saves on air hose and air consumption.

RIGHT for Demolition Work — CP Demolition Tools afford maximum penetration yet their easy handling qualities and responsive throttling action are ideal where footing is hazardous. Capacities range from the CP-111 (25 lb. class) to the CP-117 (80 lb. class).

RIGHT For Dependable Air Supply — CP "Power Vane" Rotary Compressors afford thousands of hours of trouble-free service with minimum attention. CP Rotaries are available in capacities of 125, 210, 365, 600 and 900 cfm.

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It's built like a tire!

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- Tube of high quality neoprene for maximum oil resistance.
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- *Exclusive:* Two counter-spiraled plies of tough special yarn floated in resilient rubber for outstanding strength, shear resistance and flexibility.
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Buying second-rate, short-lived hose is no short-cut to economy. Get "U. S." quality hose for the biggest savings. No matter what your hose problem may be, "U. S." can solve it. Get in touch with any of United States Rubber Company's 27 District Sales Offices or write address below. You will obtain the correct job-engineered hose, and the guidance and advice of an expert staff of "U. S." engineers.

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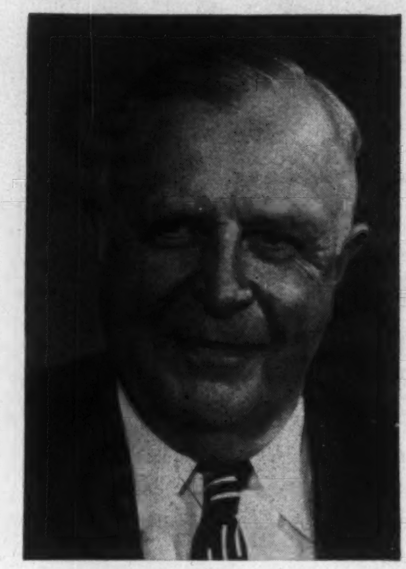


A. D. Edmonston

Two West Coast Engineers Retiring From State Posts

A. D. Edmonston, California State Engineer for the last five years, plans to retire on Nov. 1. He has been in state service for 31 years and looks forward to private practice as a consulting engineer.

Recognized as a leading authority on California water problems, he has attracted considerable attention in recent years because of his recommendations that the state build the $1.5-billion Feather River Project and take over the federally built Central Valley Project. Both have been controversial issues (ENR, July 24, 1952, p. 66).

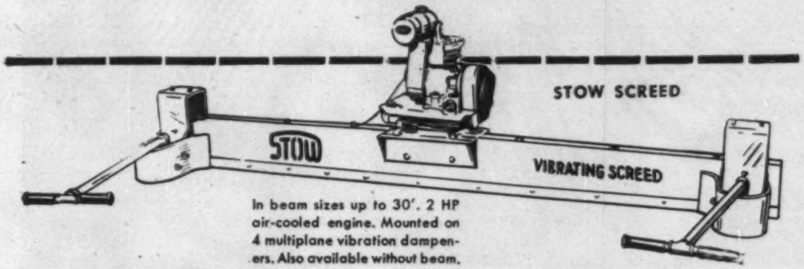
Gerald H. Jones, assistant state engineer, will retire at the same time. He has had supervision of the safety of dams, operation and maintenance of the Sacramento River Flood Control Project, flood damage repair programs, state hydraulic construction projects, snow surveys and beach erosion control.

A civil engineering graduate of Stanford University, Edmonston served as engineer on various water projects in California until he entered state service in 1924 as cost estimator for the State Division of Water Resources.

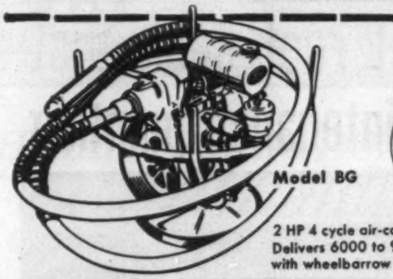
He later became hydraulic engineer in charge of investigation of California water resources and had charge of formation of the State Water Plan and the CVP. In 1945, he was named assistant state engineer and held the post until Edward Hyatt's retirement in 1950.

In addition, Edmonston has served

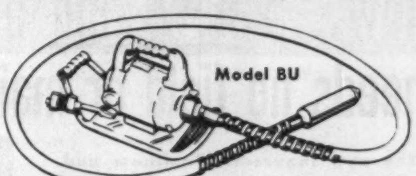
Concrete facts about Concrete Vibrators and Screeds



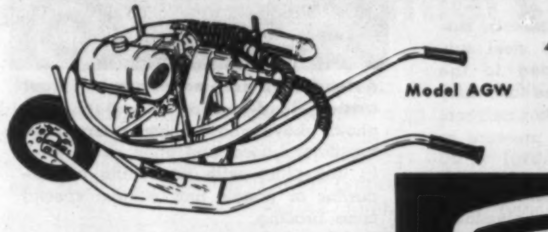
In beam sizes up to 30'. 2 HP air-cooled engine. Mounted on 4 multiplane vibration dampeners. Also available without beam.



2 HP 4 cycle air-cooled engine. Delivers 6000 to 9300 Available with wheelbarrow mount.



2 HP at 9000 VPM
115 V. AC or DC



4½ HP 4 cycle air-cooled engine. Mounted on wheelbarrow for easy maneuverability. Delivers 6000-9300. Available without wheelbarrow.

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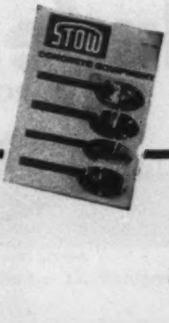
Here is the name you want!

The high operating speeds of the new STOW line of Concrete Vibrators make possible the use of heavy duty, light weight flexible shafting and lighter, more efficient vibrator heads—which speed operations, cut costs. And, STOW design provides convenient, practical speed control so *attachments may be used directly on the vibrator shafts.*

STOW SCREEDS—permit placing more than 300 cu. yds. in less than 8 hours; strike off and impact in one operation; leave surfaces true to grade; work up to and around manhole covers and obstructions.

See your STOW distributor about STOW vibrators and screeds today. Send for free Catalog 552.



STOW MANUFACTURING COMPANY
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WHAT'S NEW in roof deck?

now...a new kind of roof deck that needs no field or maintenance painting

The new Ingersoll aluminum and porcelain enameled roof decks are designed to give a more attractive, more efficient industrial ceiling at substantially lower costs in time and money.

A system of full-floating panels, simply clips on to galvanized steel subpurlins which are welded to the building purlins. This means fast, easy erection and permits expansion and contraction without the usual pressure or strain.

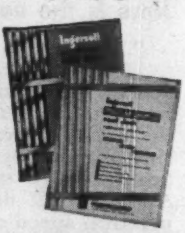
Field and maintenance painting are unnecessary with either the aluminum or the porcelain enameled decking. Both give a highly attractive ceiling that lasts for years, contributes to lighting efficiency. Aluminum deck has thermal insulation value.

The highly corrosive-resistant porcelain enameled steel decking is double coated with chemically inert porcelain enamel. It is designed for use where moisture, acids, etc., damage ordinary decks. Also excellent in dairies and other places where its gleaming look is desirable.

Accessories accommodated without cutting load-bearing members. The photo above shows how sump pans, ventilator bases, and other accessories fit into place with no cutting of subpurlins or panels and without special cross bracing.

Exceptional strength of these decks is shown in Pittsburgh Testing Laboratory reports. They will be promptly submitted on request.

Investigate now!
New Ingersoll Roof Deck may be exactly what your next job calls for. Learn the whole story now. Illustrated booklets are available to give you all the details.



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as head of the California Division of Water Resources, secretary of the Water Resources Board, executive officer of the California Water Project Authority and member of the Water Pollution Control Board.

Assistant state engineer Jones has been in state service for 31 years. His earlier posts were with the East Bay Water Co. on construction of San Pablo Dam and tunnels, with the city of Napa on its Milliken Canyon Dam project, and with the East Contra Costa Irrigation District as chief engineer. He has also worked on miscellaneous irrigation, water works and power developments, including the Salmon Creek Dam in Alaska.

To Play a Leading Role At Road Meeting in Rome

James A. Anderson, Virginia commissioner of highways, will serve as one of the three discussion leaders at the Second World meeting of the International Road Federation, to be held in Rome, Italy, next month. Other rapporteurs are from London and Paris.

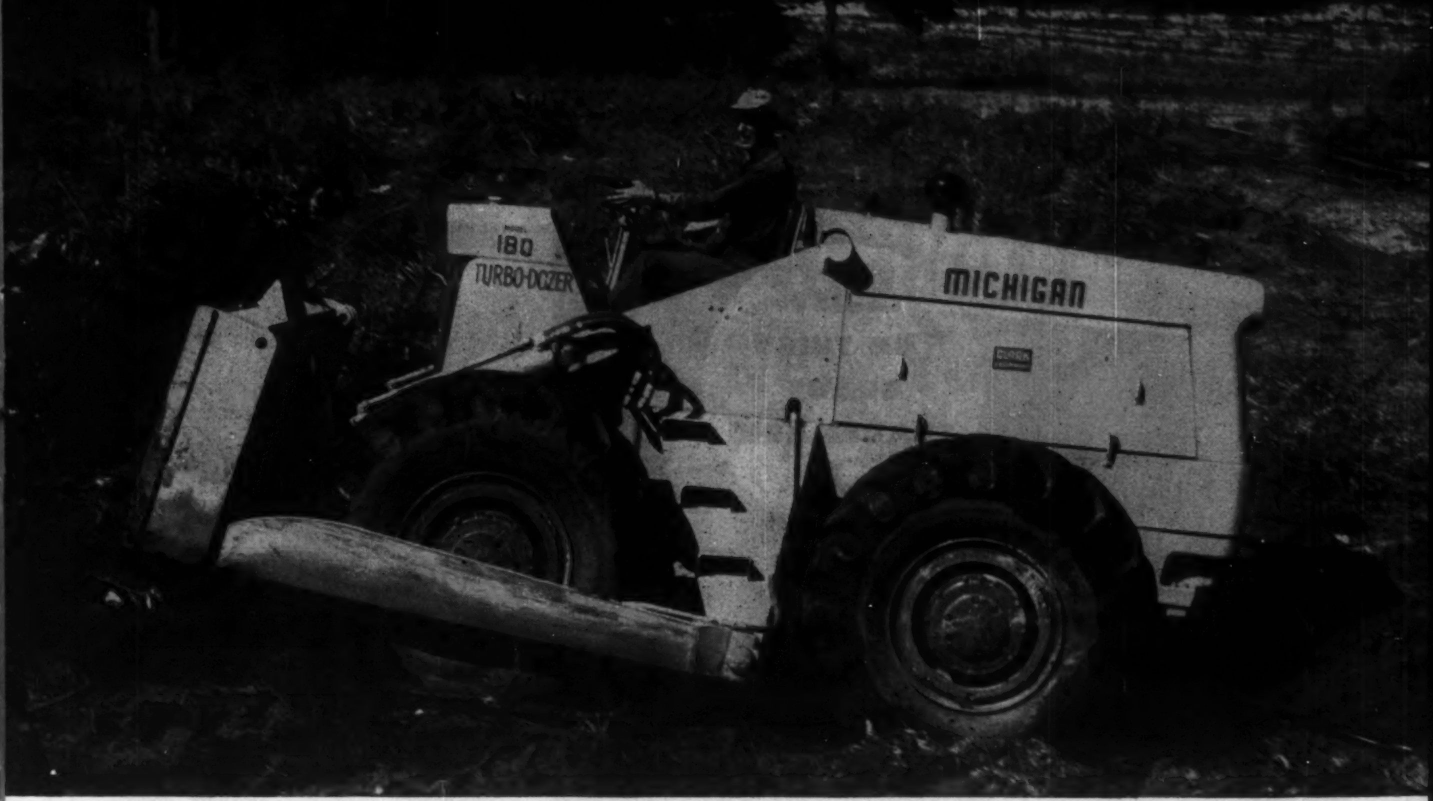
Appointed Virginia highway commissioner in 1941, Anderson served as president of the American Association of State Highway Officials in 1951 and three years later was awarded the Bartlett Award for individual contribution to highway progress.

At the forthcoming meeting of the federation, he will direct discussion and reports on technical training, including that of highway engineers, traffic engineers, and road equipment operators and mechanics.

Although Anderson was state engineer and director of the Federal Public Works Administration in Virginia from 1933 to 1936, he devoted most of his early career to teaching. At the time of his appointment to the highway post, he was dean of the faculty at Virgina Military Institute, with the rank of brigadier general in the state guard, having previously served as head of the civil engineering department.

The International Road Federation was established seven years ago as a non-profit, non-political agency to encourage the development and improvement of highways and highway transportation throughout the world. With offices in Washington, London and Paris, it has member national organizations in 56 countries.

Before returning to the United States Anderson will make an inspection tour of the highways in Italy, France, Germany and the United Kingdom.



Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. At 27 mph, it runs rings around any dozer on the market!

Power-tilting bowl. A powerful double-acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. You can change the angle of the bowl from "dig" to "float" as you travel—work the cutting edge back and forth under stumps and boulders to uproot them. Two 6-inch lift cylinders give you tremendous lifting power and down-pressure—you can raise the cutting edge from 24¼ inches below ground level to 43¾ inches above.

High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up"

Full traction while turning. The Turbo-Dozer gives you full tractive effort even in a turn. *All four wheels are always driving,* except when you declutch the rear axle for highway travel. Rear-wheel steering eliminates unnecessary tire wear —you don't brake or drag your inside wheels on a turn. If one wheel begins to slip, a locking differential automatically applies power to the wheel with the firmest footing.

Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two finger-tip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

The 3-to-1 Clark torque converter gives you a steady power flow, regardless of speed. As the load gets heavier the torque output automatically increases up to 300% at stall speed—gives you the extra torque to plow through the toughest spots. You can't stall the engine, and there's no clutch to slip.

Prove it for yourself. The new Michigan Turbo-Dozer gives you faster cycles and more yardage in every shift—more dollars of profit every day. Ask your local Michigan distributor to prove it, with an on-the-job demonstration; or write direct for detailed specifications. The Turbo-Dozer is available on the low-cost Michigan Lease Plan: no down payment, pay as it produces!

MICHIGAN is a trade-mark of Clark Equipment Co.

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Construction Machinery Division
390 Second Street
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SHEATHING

THIS distinctive PLYSCORD stamp on the panel identifies genuine DFPA fir plywood sheathing —quality-tested by DFPA to protect the buyer and assure performance. Write for new PLYSCORD calculator—handy slide rule giving recommended nailing procedures, thicknesses, etc. FREE from Douglas Fir Plywood Association, Tacoma 2, Wash.

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INSIST on DFPA grademarked fir plywood! EXT-DFPA and PLYSHIELD for outdoor use . . . PLYPANEL for paneling, built-ins . . . PLYSCORD for sheathing . . . PLYBASE for underlayment . . . PLYFORM for concrete form work. Other grades for other uses

Public Health Officers On Foreign Assignments

Several members of the commissioned engineer reserve of the U. S. Public Health Service have been called to active duty and assigned to Central and South America as participants in the International Cooperation Administration Program. Among them are:

- Robert Brewer, district sanitary engineer with the California State Health Department in San Bernadino, who has gone to Surinam, South America, to become principal sanitary engineering advisor to the Director of Health, as a member of the U. S. Operations Mission to Surinam. He will be a consultant in the field of general sanitary engineering and environmental sanitation, and will also develop and supervise training courses for native sanitary engineers.
- Linvil G. Rich, professor of sanitary engineering at Virginia Polytechnic Institute, who has reported to La Pas, Bolivia. His job is to organize and conduct a training course for Bolivian sanitary inspectors who will be assigned to health centers and other projects throughout the country. Consultation with health officers on improvements in sanitary inspection techniques is also one of his functions.
- Scott W. Brandon, formerly with the U. S. Operations Mission to Iran, who is now in El Salvador, Central America, as chief sanitary engineer with the Operations Mission to that country. His new duties are primarily related to the planning and supervision of new sanitary engineering projects. Before going to Iran in 1951, Brandon was an assistant engineer with the Corps of Engineers in the Panama Canal Zone.

Illinois Central Engineer Retires After Long Career

John E. Fanning, assistant to the chief engineer of the Illinois Central Railroad, has retired after fifty years of service with the company.

In the wake of his retirement, Mark Block, engineer of bridges, has been promoted to assistant to the chief engineer; Elmer A. Johnson has become engineer of bridges; and Alphus L. Leach has taken over as assistant bridge engineer.

Fanning's career with the company began as an instrument man in Gulfport, Miss., following his graduation from the University of Mississippi. He held various engineering positions, including those of district and division engineer, and was named assistant to the chief engineer in 1942.

First BOLTED structure in New York City

Erected with RB&W high strength bolts faster, quieter, and at less cost

35 Park Avenue; Architects, Sylvan Bien — Robert L. Bien; Structural Steel Fabricated and Erected by Grand Iron Works, Inc.; Builder and Owner, Anthony Campagna and Sons.

Two-man bolt team completes more joints per day than the usual four-man rivet crews . . . eliminates hazards of handling hot rivets.

IN NEW YORK, too, the many advantages of construction with bolted steelwork are now being realized. First such structure is this new 18-story apartment building in New York's exclusive Murray Hill district. Field joints are all made with RB&W high strength bolts . . . faster than by riveting, with no ear splitting clatter, and with a big saving in work and costs.

Quickly and uniformly tightened to proper load with impact wrench, RB&W high tensile bolts clamp steel members together with a terrific grip. They develop optimum shear and tension in each joint . . . stay tight under vibration and dynamic loading.

RB&W is the largest independent supplier of high strength bolts for construction. Used from coast to coast, RB&W bolts are noted for their quality, uniformity, ease of assembling and complete dependability for bridges, buildings, and equipment.

Get full data on how bolting gives you a *better* structure at a *saving*. See Sweets Architectural or Industrial Construction File (2cR/V) or write to Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W

110th year

Plants at: Port Chester N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee, New Orleans, Denver, Seattle. **Distributors** from coast to coast.

Looking for a TOUGHER STEEL?

Unusually tough, even at sub-zero temperatures, Lukens "T-1" steel can reduce equipment costs.

Failure from abrasion or from impact can happen to the steel in your equipment, too. Here's the answer—the tougher steel you've been looking for. Lukens "T-1" steel has excellent resistance to the combination of wear and impact, is tough enough to withstand unusual stresses and pressures as well as shock at either sub-zero or high temperatures, thus lowering maintenance costs and lengthening equipment life.

Equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Lukens "T-1" steel can be fabricated not only in the shop but also in the field, through proper design procedures. Because of its high yield strength (over 90,000 psi) this new steel offers lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. And Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for equipment builders through the use of wider plates that require fewer welded seams.

The latest addition to Lukens' complete line of carbon, alloy and clad steels, this quenched and tempered alloy plate steel's unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for the new 28-page Bulletin 781. Address: Manager, Marketing Service, 774 Lukens Building, Lukens Steel Company, Coatesville, Pa.

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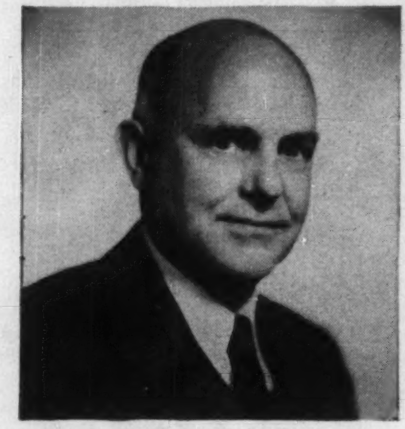


R. G. Wadsworth

R. G. Wadsworth Retires From San Francisco Post

Ralph G. Wadsworth has retired as city engineer for San Francisco and plans to return to the engineering practice which he left when he took the city post ten years ago.

His successor is Reubin H. Owens, a civil engineering graduate of the University of Dublin, who has been chief designer for the city engineering bureau for the last eleven years.

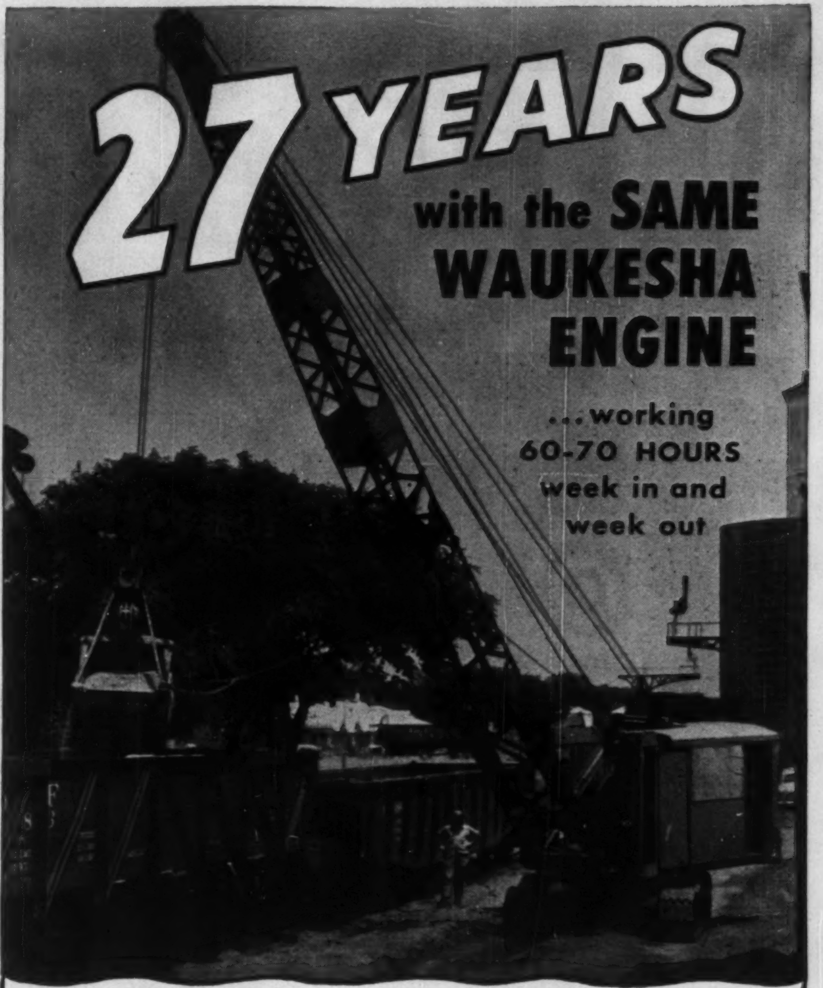
During his service with the city, Wadsworth supervised the planning and construction of more than $70 million worth of projects. Among them were the $6-million Broadway Tunnel, two sewage plants and an extensive city street program.

Wadsworth's engineering career began in San Francisco, where he worked for Fred H. Tibbetts after obtaining his civil engineering degree from the University of California. He established his own practice in 1931.

During the late 1930's, Wadsworth supervised construction projects undertaken by state and federal relief organizations in California, and later served for one year as state director of the U. S. Employment Service. He is presently a member of the San Francisco Regional Water Pollution Control Board, an advisor to the University of California's Institute of Traffic and Transportation Engineering, and engineer for Joint Highway District No. 10—a post he will retain.

Highway Engineer Joins National Lime Association

Conrad M. Kelley, who recently headed up the Dallas District laboratory of the Texas Highway Department, has joined the National Lime Association. With headquarters temporarily in Garland, Texas, he will provide technical information and



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...working 60-70 HOURS week in and week out

Unloading 32 railway cars of sand in 9 hours! That takes a fast operator, a good crane, and speedy, responsive, reliable power.

Contractors L. V. Hites and M. W. Martin of Topeka, Kansas, have such a combination.

Operator, Earl Walker, has been speeding up construction jobs with this Waukesha Engine powered American Crane ever since 1928.

That's 27 years' straight—working 60 to 70 hours every week. The Waukesha JL (Serial G-181) is the crane's original engine. It's had several overhauls, of course. Once it got a set of second-hand blocks (when new ones couldn't be had). Sure they offer Earl new cranes. He likes this crane and its Waukesha.

...and modern Waukesha Engines have even greater stamina and reliability

GAS • GASOLINE • NORMAL or TURBOCHARGED DIESELS
—up to 1135 horsepower for every industrial service

Modern 1197 cu. in. Waukesha Turbocharged Diesel—Model WAKDBS—over 350 hp—used in many makes of cranes, shovels and heavy trucks. Send for bulletin.

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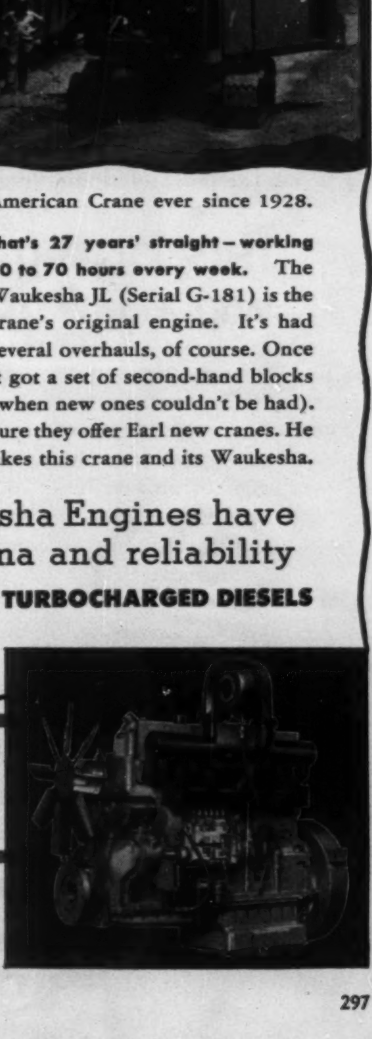

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Air-operated controls — and a crane that is always ready to go to work. Torque-Controls for smooth, accurate handling . . . and almost no clutch wear or adjustment. Short wheel base and only *six tires* so that it can turn and travel in any aisle big enough *for a truck.*

All ORTON cranes now have *Torque-Control*

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service to highway engineers on lime stabilization of road bases and sub-bases.

With his appointment, the association becomes actively engaged for the first time in highway use of lime on a nation-wide basis.

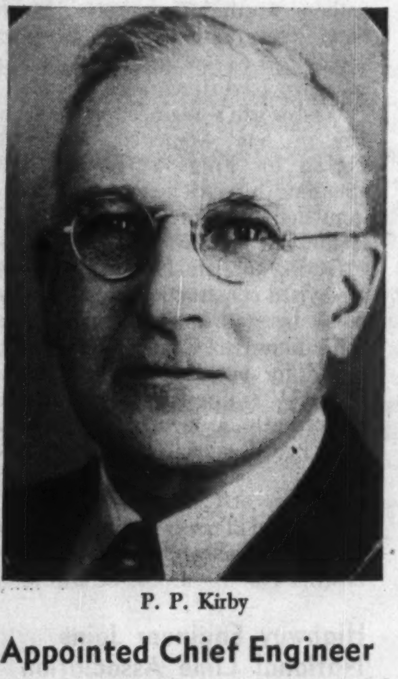
Kelley has been with the Texas Highway Department for over 16 years and has supervised laboratory testing of lime-soil mixtures since 1953. He has also been associated with highway engineering consulting firms, and has spent six years as a highway engineer with the Army, where he supervised construction and reconstruction of lime stabilized roads in military bases and camps.

Aids Mission In Korea

Charles F. Davis, Jr., member of the architectural firm of Van Keuren, Davis & Co., Birmingham, Ala., has gone to Taejon, Korea, to assist in the planning of a mission college sponsored by the Presbyterian Church.

He volunteered his services after an urgent request from Taejon for an experienced U. S. architects.

Davis, whose firm has designed a number of churches in the Birmingham area, expects to be in Korea for several weeks on the liberal arts college assignment.



P. P. Kirby

Appointed Chief Engineer

Albert Kahn Associated Architects and Engineers, Inc., Detroit, Mich., has appointed P. P. Kirby as chief engineer of its Structural and Civil Engineering Division.

Kirby joined the firm in 1933 and has been a member since 1947.

There's a Terra Cobra to match every job requirement: The big 18-yard 10-speed TH-0142 and the versatile 15-yard TH-090B.

BONUS LOADS in *all* types of material give Terra Cobras the edge when it comes to profits

It took just 38 seconds for the Terra Cobra pictured above to get a heaping load, working in hardpan shale. Because of the exclusive combination of Wooldridge design features, Terra Cobras get bonus loads whether you're working in sand or gumbo or just plain dirt—with ease and speed like nothing else in their class. And they dump faster, easier, cleaner, even in sticky clay. Today, when every fraction of a cent per yard makes the difference between profit and loss, Terra Cobras have other important advantages that can't be overlooked. There's balanced power and speed for all haul and load conditions—exclusive air-actuated winch that's "live" for full scraper control *all the time,* located up out of the dirt where it belongs—and especially the Cobra's ruggedness and accessibility that have never been equalled for cutting service and maintenance time to the minimum.

Because your profits are at stake, it will pay you to get together with your Wooldridge dealer to find out why Cobras can give you *bonus loads* and performance to give you an edge in competitive bidding—and profits.

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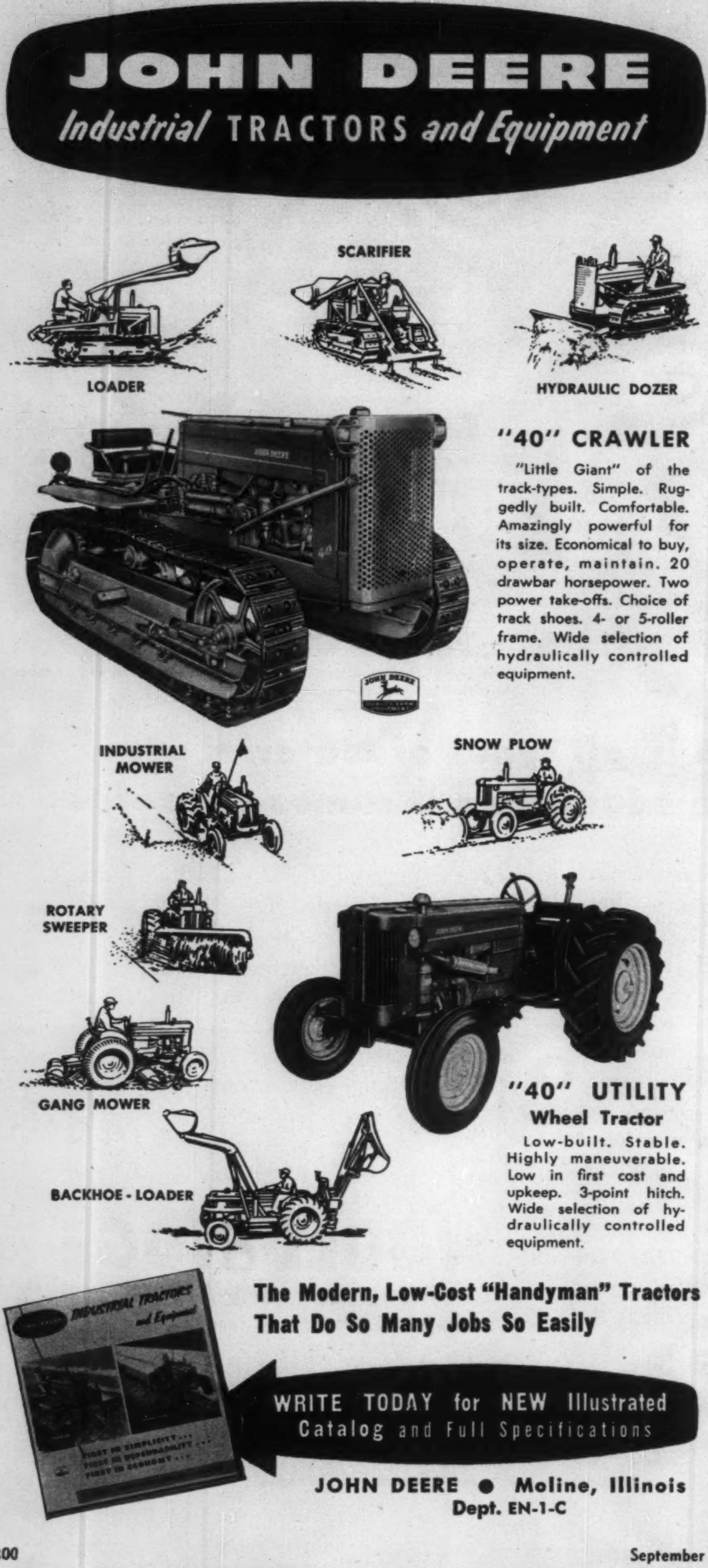

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MEN AND JOBS

Men and Jobs Briefs . . .

• **Corps of Engineers – Sam W. Hunter,** specialist in soil mechanics and foundation engineering in the Wilmington, N. C., district office of the Corps, resigns to become professor of civil engineering at the University of South Carolina, where he will teach soil mechanics.

• **Associations–John T. W. Babcock** is appointed permanent secretary of the Metal Roof Deck Technical Institute, an association of producers aimed at improvement of roof deck construction. He succeeds **E. A. Miller,** manager of the Building Panel Division of Detroit Steel Products Co., who has filled the job for seven years on a part-time basis.

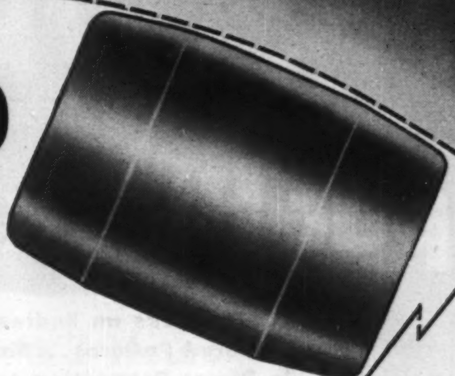
• **Careers–Paul C. Northrop** is named acting roadmaster for Multnomah County, Ore., succeeding the late **George W. Buck** who had held the post since 1925 . . . **Odell Strickland** takes over as superintendent of the city water department at Selma, N. C., replacing **Charles Reaves,** who recently resigned.

• **Business**–Ammann & Whitney, New York, N. Y., consulting engineers, appoint **Albert L. Best** an associate . . . **Angus J. O'Brien** is named to the newly-created post of vice president and director of engineering and manufacturing, Gar Wood Industries, Inc., Wayne, Mich. . . . **Frank B. Warren** joins The Kuljian Corporation, Philadelphia engineers and constructors, and is named general office manager.

• **Honors**–Next month, the Franklin Institute will award a Frank P. Brown Medal to **Charles S. Leopold,** Philadelphia consulting engineer, for his contribution to air conditioning, particularly in the research and development of air conditioning techniques and the application of air conditioning to several important structures.

• **Education**–The University of Michigan receives a $10,000 gift from **David B. Steinman,** bridge designer and chief engineer of the Mackinac Bridge, for use as a scholarship fund in the School of Engineering . . . Four top students from state forestry schools in Michigan, Minnesota, Montana and Oregon complete a ten-week course in wood technology and utilization at the Washington, D. C., laboratory of Timber Engineering Co. —this is the sixth year of the scholarship program.

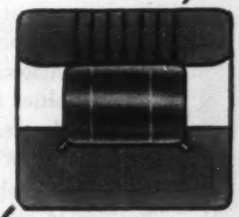
NOW... all Tru-Rol Bearings *have* CROWNED ROLLERS



● When a straight cylindrical roller bearing is under load, the highest stresses tend to concentrate at the roller ends. Stresses may become excessive and cause early bearing failure.

Crowning is a Rollway grinding refinement that adds a long radius curve to the roller ends. This relieves the high stress areas—allows the rollers to take heavier loads and reduces the effect of slight shaft misalignment or deflection. Bearings can be load rated at substantially higher values—provide a longer service life.

Crowning is but one of the many engineering advances built into Rollway Tru-Rol Bearings. Write for the complete story. Rollway Bearing Co., Inc., 567 Seymour St., Syracuse, N. Y.



Crowned roller under full load — stress uniformly distributed.

Crowned Tru-Rol Bearings available in the following type:

Full Roller

Segmented Steel Retainer

Stamped Steel Retainer with Guide Lips

Carefully selected crown radius, varying from 70" to 260", provides proper relief for normal loading to which bearing will be subjected.

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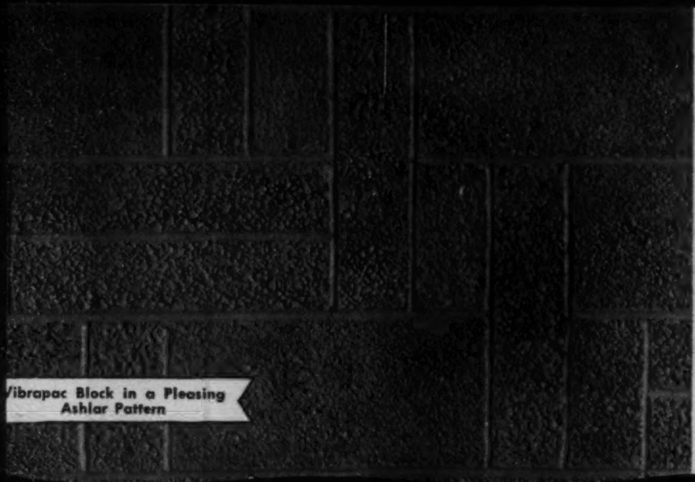
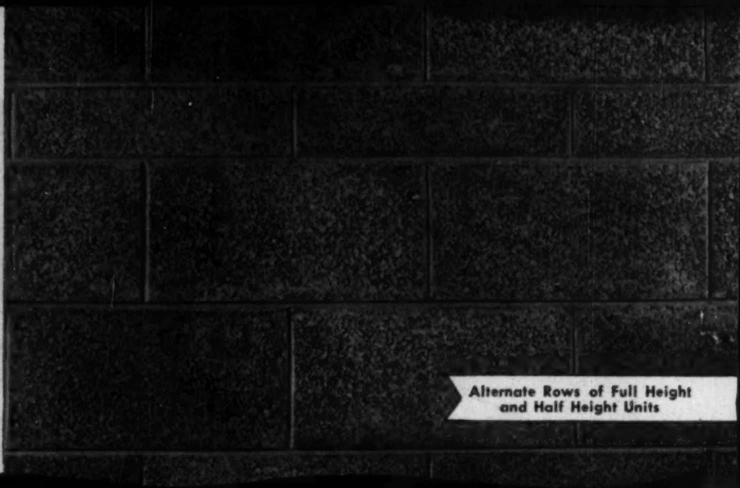


Vibrapac Block in a Pleasing Ashlar Pattern



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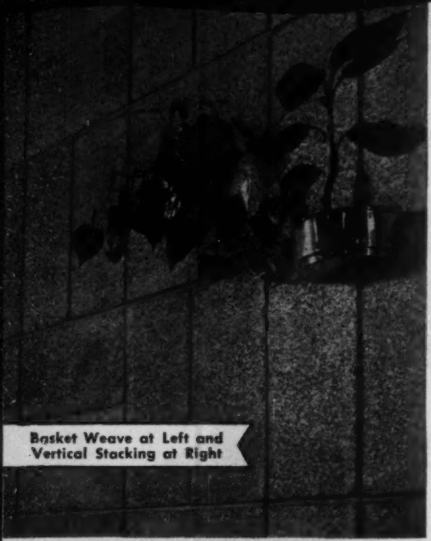
Vibrapac Block is Versatile!



Basket Weave at Left and Vertical Stacking at Right

. . . Provides an Endless Variety of Textured Patterns . . . Sizes Available in Direct Proportion to Wall Areas

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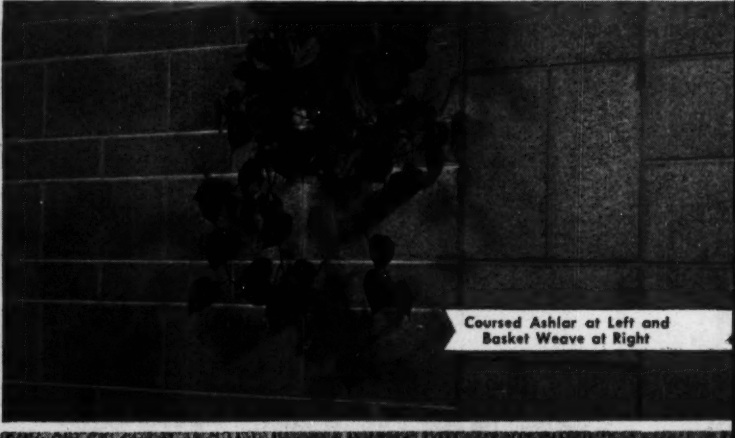
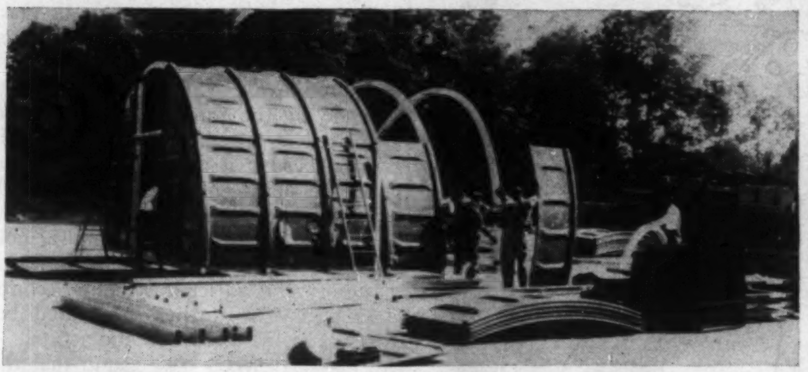


Coursed Ashlar at Left and Basket Weave at Right

Vertical Stacking at Left and Horizontal Stacking at Right.

Another Interesting Example of Modern Ashlar Pattern



STOCKPILED COMPONENTS are rapidly put up to form one of two structures comprising Air Force's new radar shelter. Fully-equipped shelter is erected in less than 3 hours by 14-man crew.

Plastic Radar Shelter Erected in 3 Hours

A lightweight plastic and aluminum shelter that can be erected in less than 3 hours has been developed for the Air Force by Luria-Cournand, Inc., Havre de Grace, Md. Two arch-shaped structures, 32x24 ft and 18x24 ft, and their radar equipment comprise the portable shelter which can be erected by a 14-man crew equipped with only ladders and wrenches. The structures are designed to withstand winds up to 90 mph.

Framing consists of aluminum arches spaced about 4 ft apart Each arch is made up of four interchangeable sections, which are joined in the field by quick-fastening pins. Glass-fiber panels, 7 ft x 3½ ft, form a shell that is bolted on the aluminum skeleton.

Floors are aluminum-faced honeycomb sandwich panels. They are laid on beams, which, in turn, rest on jacks. The jacks make it possible to level the structure after it is erected.

A typical panel has an olive-drab exterior cover, an insulation blanket and an interior liner—all of glass-fiber, with a rubber vapor barrier between the insulation blanket and the interior liner.

The shelter was developed to enable radar teams to set up an emergency warning system in a few hours and be able to dismantle and move on quickly. The fully equipped shelter can be transported by three trucks.

Protection From Radioactive Fall-Out

An inexpensive wood-fiber building board said to filter radioactive fall-out, disease-laden particles and poison gases has been developed by the U. S. Forest Products Laboratory under contract with the Army Chemical Corps.

Called "diffusion board," the new material is presently undergoing extensive testing by the Laboratory and Army Chemical Center in Maryland for use in shelters.

The diffusion board looks like ordinary building fiberboard. Chemicals in it screen out the deadly gases and particles, at the same time permitting life-sustaining oxygen and carbon dioxide to pass through.

Present small-scale production is for military testing, but sources claim it will be within everyone's reach eventually. Based on pilot-scale production tests at two plants, the fiberboard can be manufactured with equipment like that used to make ordinary building fiberboards, and any species of wood can be pulped to make it.

According to J. A. Hall, director of the Forest Products Laboratory, shelters can be built with the new material to protect troops and civilians.

The new fiberboard, the result of three years of research, was developed by Alfred J. Stamm and Harold Tarkow, both members of the wood chemistry division of USFPL, which is headed by Edward G. Locke. Leonard A. Jonas, Chemical Corps officer, worked closely with them.

Corrosion of Underground Bolt Materials Examined

A recent study by the National Bureau of Standards has shown that electrical measurements made in the laboratory can be useful in predicting

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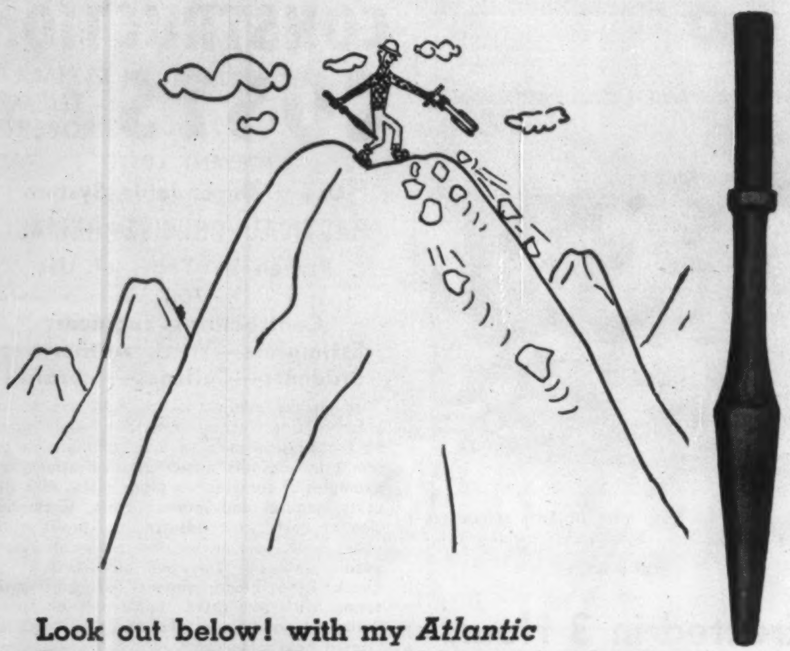

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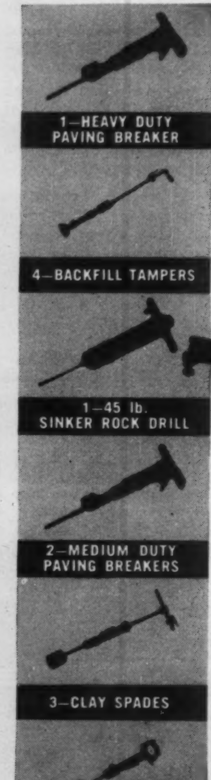
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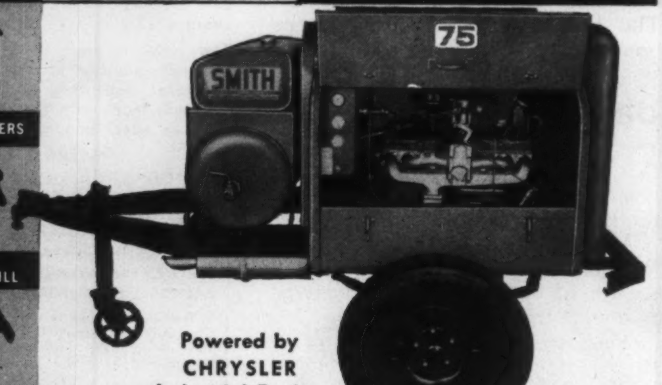

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The Smith 75-P delivers continuous on-the-job compressed air—*saves* your big air compressors—*adds* to job profits. Actually delivers 4 more cu. ft. per minute than its 75 c.f.m. rating. Three cylinders are used for power, three for compression. Simple compact design—tow it everywhere, job to job. Designed for high compression with large valve area, smooth carburetion. Super-finished bearings and pistons; water-jacketed discharge area. Uses only 1½ gals. gasoline per hour! Has large toolboxes with hasps.

Write for literature and name of nearest Smith dealer.

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430 College Street • Bowling Green, Ky.

corrosion resistance of bolt materials used underground. Bolt materials can be protected against corrosion by making them cathodic to the structures which they fasten.

Presumably, bolts and structures made of the same materials should corrode at the same rate. However, it is believed that the many sharp edges on the surface of bolts have an accelerating effect on the corrision rate. In addition, when the soil around the bolt is packed more tightly than the earth around the adjacent structure, corrosion may be further accelerated because of increased galvanic action.

Other workers have found that the addition of 1% copper to cast-iron bolts resulted in a marked reduction of corrosion on the bolts when coupled with plain cast iron. The work of these investigators also suggested the useof a small amount of nickel in ferrous bolts. As extensive use of low-alloy bolts would not result in prohibitive installation costs to industry, such bolts were arbitrarily chosen for the main laboratory study. High-alloy cast-iron and nickel-copper alloy (70-30) bolts were also used.

Experiments Indicate Remedy For Limestone Building Woes

A water solution of sodium methyl siliconate (SC-50) is an effective water repellent for six widely different types of Kansas limestone used for building purposes, tests by F. C. Lanning, Kansas State College research chemist, indicate.

Lanning's experiments showed that limestones treated with the sodium methyl siliconate absorbed little water, and that the rate at which the stone absorbed water increased only slowly during a period of 25 freezing and thawing cycles, which he believes is the equivalent of several years of natural weathering. He also found the coating very durable under infrared radiation, indicating it would resist effects of sunlight.

A solution containing 4% silicone solids gave better water repellency to porous limestones than did a 2% solution. There was no advantage in using a concentration of more than 4%.

Solutions of methyl and ethyl silicone resins dissolved in a solvent such as toluene (SR-53 and C-25) are recommended for brick and concrete structures. They have sometimes been used as water repellents for limestone though they are not recommended for this use.

Owned by George M. Brewster and Son, Inc.—this new Lorain 85, with a 2½-yd. dipper and a 26-ft. boom, is working on the New York Thruway, where contract called for 2½-million yards of grading on a 4.7 mile stretch near Nyack.

New Lorain 85 drives through fluid

for maximum economy and efficiency

The new Lorain 85, recently introduced by the Thew Shovel Co., Lorain, Ohio—features a Twin Disc Fluid Power Take-Off to provide maximum economy and efficiency. The fluid drive unit provides a "cushion" that eliminates shock loads—protecting *both* driving and driven equipment. It prolongs the life of cables and reduces fuel consumption and maintenance costs.

The Lorain 85, shown above, is the *seventy-seventh* Lorain to be purchased through the years by George M. Brewster and Son, Inc., Bogota, N. J. It is one of four new "85's" just added to this well known contractor's fleet. This might be interpreted as a vote of confidence in Thew-Lorain—and in their *standard* component parts.

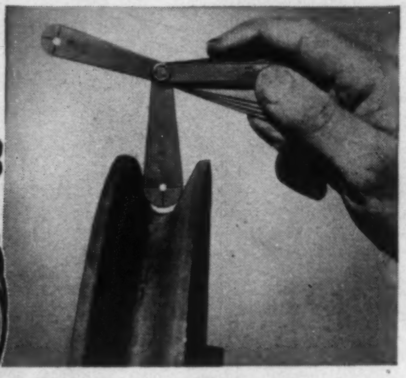
The Twin Disc fluid PTO has been time and job proved on other Lorain models for many years. In fact, Thew-Lorain pioneered the application of fluid power take-offs on power shovels . . . and Twin Disc Fluid Power Take-Offs are *standard* in *all* Thew-Lorain crawler-mounted units in the heavy-duty ¾-yd. and the 1, 2, 2½-yd. classes. Let Twin Disc power linkage specialists help solve *your* particular problem! Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

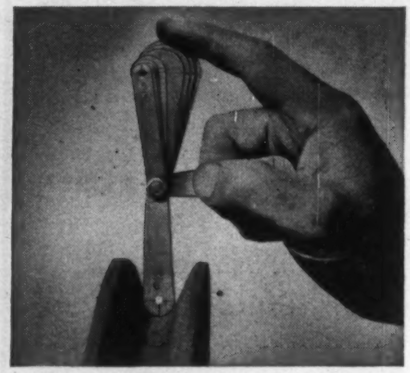
TWIN DISC
Fluid Couplings

Tuffy tips on choosing the

Measure Groove Diameter Accurately

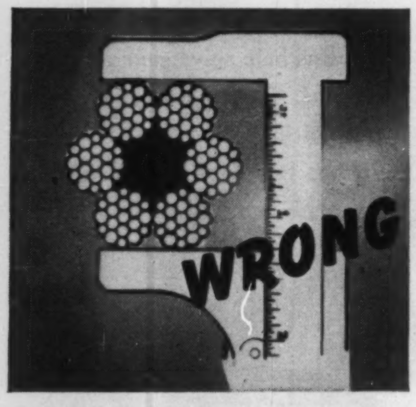


Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.

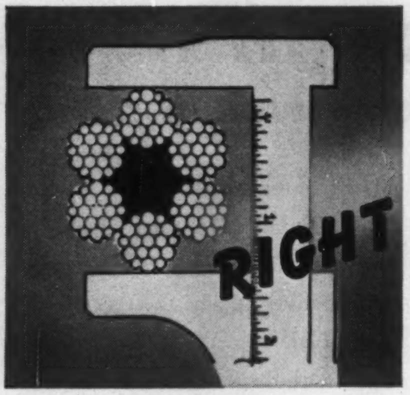


Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

If Present Rope Is Correct Size, Measure with a Caliper

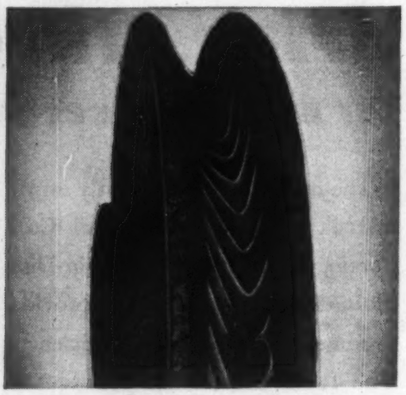


Measuring the Wrong Diameter is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.



Measuring the Right Diameter is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

Replace Worn Sheaves



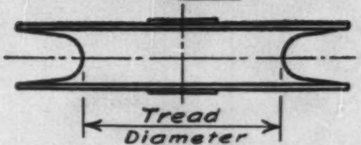
When Replacing Rope, check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

right replacement Rope

Beware of Critical Tread Diameters

It is highly important to accurately measure the tread diameter of the smallest sheave or drum on any machine. Here's why. It is on this sheave or drum that the wire rope will get the greatest wear. Some constructions of wire rope will work on smaller tread diameters than others without lessening their service life. Engineers have determined the critical tread diameter for different constructions as shown in the table at the right. Also shown in the table is the minimum recommended tread diameter which is 50% larger than the critical tread diameter.

Example, the tread diameter of your smallest sheave is 24 inches. You know that a 1-inch rope is necessary. Referring to the table at the right you see that the 6 x 19 Warrington or Filler wire is suitable because the minimum tread diameter recommended for it is 24 times the diameter of the 1-inch rope. This gives you a margin of 50% over the critical diameter of 16 inches. If flexibility is a factor in the operation then you would choose the Filler wire type of rope with fiber core.



Construction of Rope	Critical Tread Diameter	Minimum Recommended Tread Diameter
6 x 7	28	42
18 x 7	24	36
6 x 19 Seale	20	30
6 x 19 Warrington or Filler Wire	16	24
6 x 31	15	22
8 x 19 Seale	14	21
6 x 37	12	18
8 x 19 Warrington or Filler Wire	12	18

To arrive at critical tread diameter and minimum recommended tread diameter multiply the numbers above by the rope diameter.

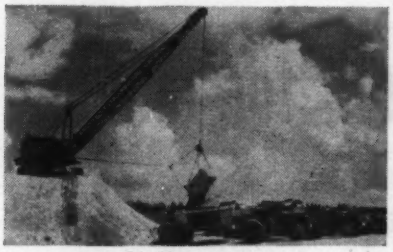
Use The "Know How" of *Wire Rope* Specialists

Stemming from many years of cooperation with users and machine builders mastering wire rope problems, is a family of special ropes for special purposes. Into each is incorporated the rope construction, the grade of steel and operating characteristics found to be best for the service for which each is intended.

When you specify one of the Tuffy Wire Ropes, you can say Tuffy and forget complicated specifications!

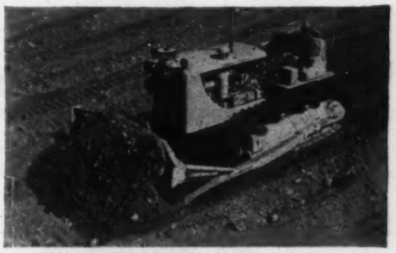
Tuffy Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.



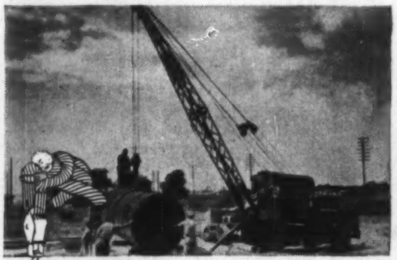
Tuffy Dragline

Constructed to give you maximum abrasive resistance with extra flexibility. Rides smoothly on grooves, hugs the drum when casting for full load.



Tuffy Dozer Rope

Increases service life . . . reduces down-time. 150' reels mounted on your dozers lets you cut-off worn sections without wasting good rope. 1/2" and 9/16" diameter.



Tuffy Slings and Hoist Line

Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine-braided wire fabric. Kinking or knotting will not materially damage fabric.

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He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

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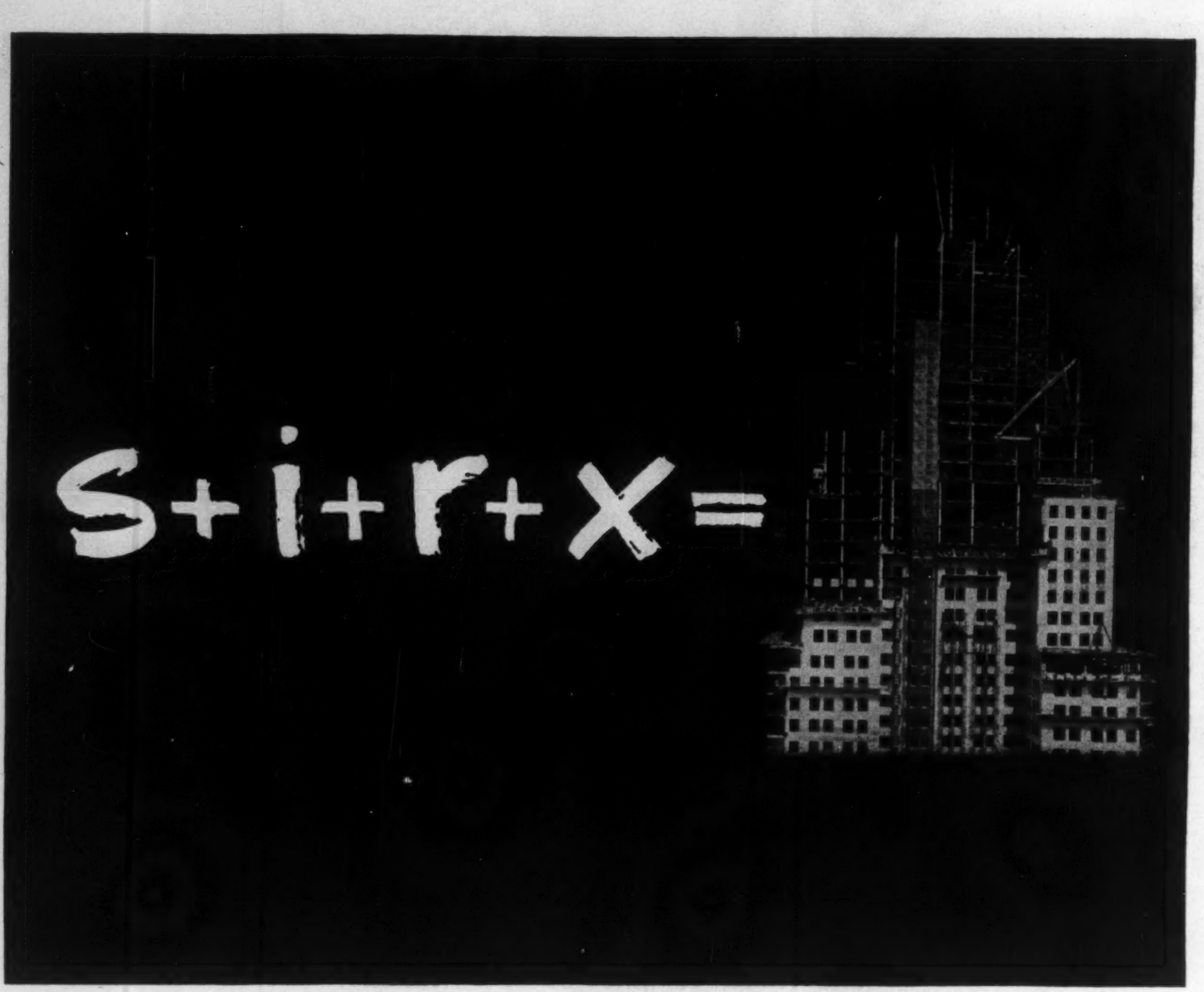

What's the formula for landing a job like this?

Skill, integrity and responsibility, of course. And something else—the final factor that could well tip the bid in your favor. *Low bond rates.*

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You save money with Indemnity's low rates. And once your credit line has been established with Indemnity, you are assured of getting bonds on future jobs without delay. See the Indemnity Company Agent today.

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LEGAL

Can You Back Out of a Bid Because an Error Was Made?

Ordinarily, a contractor who makes a mistake in a bid is not allowed to back out of it. But there are exceptions to the rule. Here's a case where relief was granted.

A school district brought an action against a contractor to recover damages resulting from the refusal of the contractor, who was the low bidder, to enter into a contract and his refusal to perform the work required by the proposed contract. The contractor counterclaimed for a judgment permitting him to rescind the bid on the ground of an unintentional mistake in the bid.

The school board made an application to have the counterclaim dismissed and the application was denied.[1] The court held that a unilateral mistake, honestly made and not tainted with fraud, may constitute a defense to such an action, and equity may decree rescission of the bid on a counterclaim. The following authorities were cited to support of the decision: Abner M. Harper, Inc. v. City of Newburgh, 222 N. Y. 670, 119 N. E. 1047; Frank W. O'Connell, Inc. v. Broome County, 198 Misc. 402, 98 N.Y.S. 2d 1009.

In another case[2] where the same issue was involved, the court made this observation: "Ordinarily no relief will be granted to a party to an executory contract in the case of a unilateral mistake. In such a case when a bid has been accepted the bidder who has made a mistake will be bound and must bear the consequences thereof. . . . However, if a party receiving the offer or bid, knows or has reason to know because of the amount of the bid, or otherwise, that the bidder made a mistake, the contract is voidable by the bidder."

---

[1] Union Free School District No. 1, Town of Islip, v. Grumbs, et al., 133 N.Y.S. 2d 409, Supreme Court of New York, August 3, 1954.

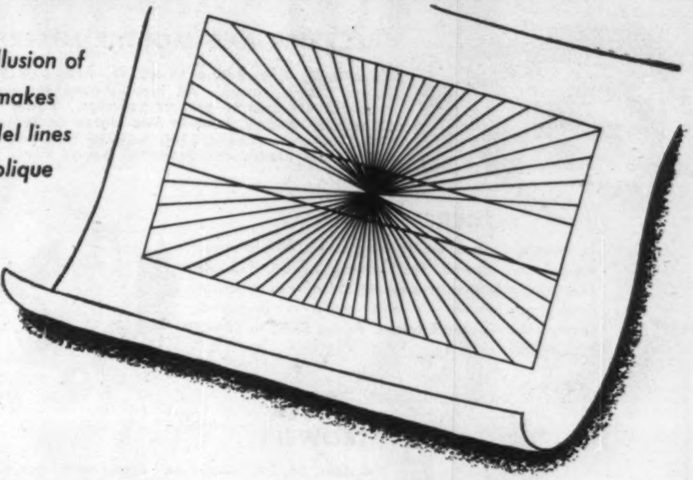
[2] Saligman et al. v. United States, 56 F. Supp. 505.

No Writing, No Contract Because So Contemplated

Under Louisiana law, oral negotiations do not result in a contract until reduced to writing, if the parties contemplated that a written agreement would be the result of the negotiations. Hence there can be no action for breach of contract until then.

The court applied this rule in an action by a contractor to recover

The Strange Case of the PARALLEL LINES



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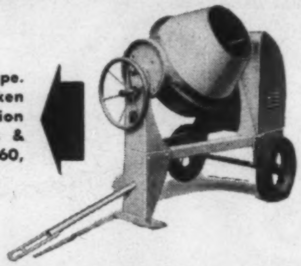
Muller's earliest objective—to make the best possible plaster and mortar mixer and sell it for the lowest possible price—was achieved by: (1) specialization on a few models . . . (2) careful selection of materials and components . . . (3) experienced workmanship . . . (4) sound distribution methods. Other Muller Machines, also, rank high in their fields for the same reasons.

PLASTER AND MORTAR MIXERS

Made in 2, 4, 6, 8 and 10 cu. ft. sizes. Electric motor or gas engine power. All models have Muller Lifetime Paddle Shaft Seal to protect bearings. Power throwouts on smaller models, built-in disc clutch on larger. Many other features. Priced $180 to $996 FOB Factory. Rubber scraper blades are available for all sizes.

CONCRETE MIXERS

3 models, 3 to 6 cu. ft. capacities, tilting type. Ample size drums, fast mixing action, Timken Bearings, electrically welded, sturdy construction throughout. Power—electric motor or Briggs & Stratton Air Cooled Engines. Prices $230 to $660, FOB Factory.



POWER TROWELS

4 sizes, 24, 29, 34 and 44" diameter Briggs & Stratton Engines. Stationary guide ring eliminates hand troweling when finishing along baseboard. Engine speed regulated by governor control on handle.

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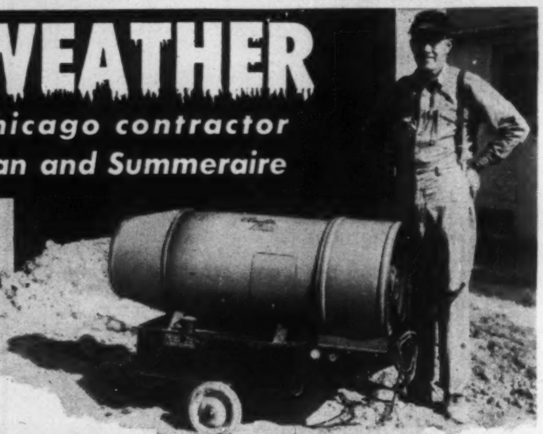
Can't stop Chicago contractor Helmar Hedman and Summeraire



300,000
BTU's PER HR.
. . . yet priced 20-30% lower than smaller heaters

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SUMMERAIRE PORTABLE, OIL FIRED SPACE HEATER

Helmar Hedman, like all contractors, makes money when jobs are finished on time . . . *weather or not.* Summeraire chases winter cold . . . dries out new construction; prevents freezing of concrete while curing; keeps workmen warm. Durable, portable, self contained; electric or gasoline engine drive, Summeraire delivers 2400 cu. ft. high velocity heated air per minute at amazing economy. 300,000 BTU capacity at a price 20-30% lower than that of smaller heaters.

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$42,802.99 as damages for breach of an oral contract to remove dirt from drainage canals. Defendant established that while negotiations had been had as to the performance of the work, no agreement had been reached as to the price that the contractor was to be paid for the work. Moreover, during the negotiations, it was contemplated that any agreement that might be reached as a result of the negotiations would be reduced to writing and signed by the parties. No written agreement was ever made.

The trial court dismissed the action on the ground that since no price had been agreed upon for the performance of the work, no contract existed. This judgment was affirmed on appeal.[1] The appellate court stated: "It is elementary in our law, that where the negotiations contemplate and provide that there shall be a contract in writing, neither party is bound until the writing is prefected and signed. The distinction is manifest between those cases in which there is a complete verbal contract, which the law does not require to be reduced to writing, and a subsequent agreement that it shall be reduced to writing, and those in which, as in this case, it is part of the bargain that the contract shall be reduced to writing. In the first class of cases the original verbal contract is in no manner impaired by the failure to carry out the subsequent agreement to put it in writing. In the second class of cases, the final consent is suspended; the contract is inchoate, incomplete, and it cannot be enforced until it is signed by all the parties. Villere v. Brognier, 3 Mart., O.S., 326,349; Des Boulets v. Gravier, 1 Mart., N.S., 420,421; Blocker v. Tillman, 4 La. 77,80."

[1] Breaux Brothers Const. Co. v. Associated Contractors, 77 So. 2d 17, Supreme Court of Louisiana, Dec. 13, 1954.

Architect Was Denied Fee When Exceeded Cost Limit

An architect may find himself out on a limb if the structure he planned can't be built within the upset cost limit.

The Supreme Court of Louisiana, for example has followed "the well established rule that where a limit is set, the architect is not entitled to his fee if the plans which he prepares cannot be constructed except by the expenditure of an amount substantially in excess of the limit. See, Rosenthal v. Gauthier, 224 La. 341, 69 So. 2d 367."

Other cases following the same rule include Andry & Feitel v. Ewing, 15 La. App. 272, 130 So. 570; Van Os v.

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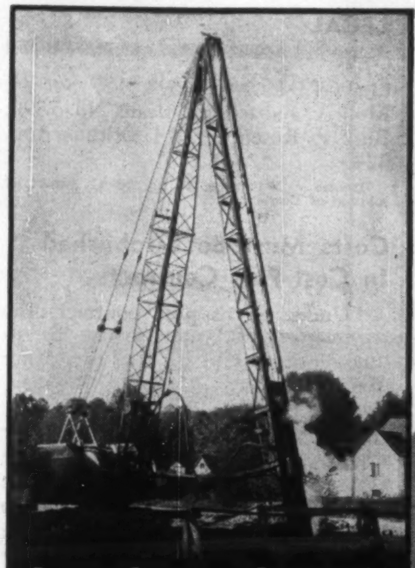
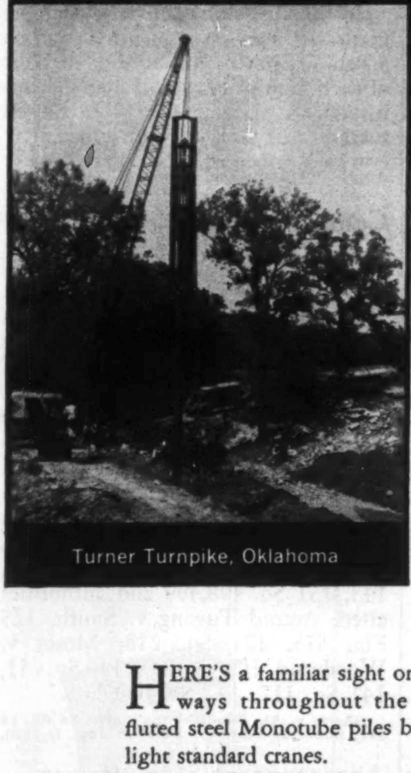


Delaware Extension to Pennsylvania Turnpike

New York Thruway



Turner Turnpike, Oklahoma

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HERE'S a familiar sight on turnpikes and thruways throughout the Nation... tapered, fluted steel Monotube piles being easily driven by light standard cranes.

Monotubes have a reputation for making foundation jobs cost less, go faster. They are installed rapidly, without complications, because of their fluted design and light weight . . . with minimum hammer energy required to overcome weight inertia. Fluted and cold-rolled for added strength, Monotubes are also recognized for exceptional load bearing capacity.

On-the-job extendibility to virtually any required length, quick cut-offs and ease of handling are additional Monotube features that help builders and contractors save time and money on a wide range of foundation jobs. Write today to The Union Metal Manufacturing Company, Canton 5, Ohio.

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Monotube Foundation Piles

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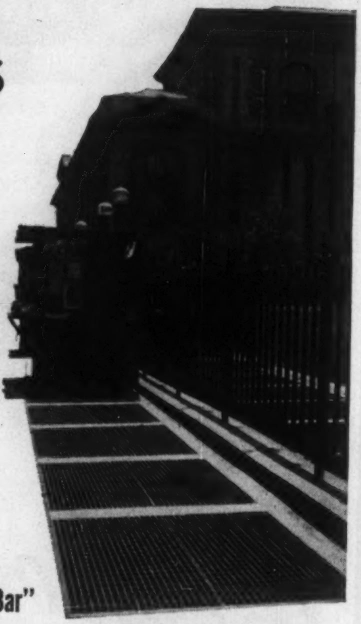
ON THE SIDEWALKS OF NEW YORK

There's no better example of a grating's ability to take a beating than this Hendrick Mitco Open Steel Flooring installation at the "crossroads-of-the-world" in New York City. It has not only withstood the weight of armies of pedestrians, but it has also taken all kinds of inclement weather in its stride. Ideal for flooring or walkaways, it provides tops in rigidity yet leaves 90% open area for light and air. For extra heavy industrial usage it's available in Heavy-Duty Steel Grating.



"Hendrick Mitco the Grating with the Deep Cross Bar"

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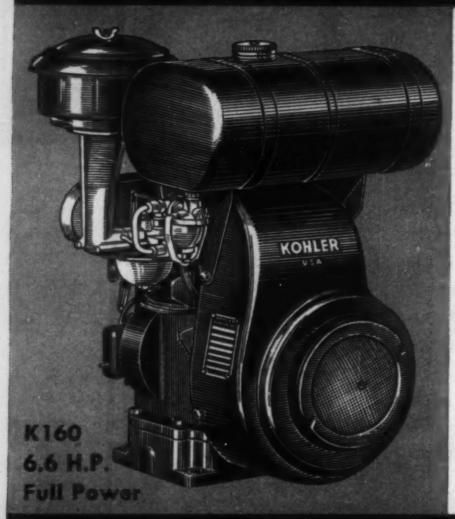

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K90........2.5 to 3.6 H.P.
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K660........12 to 26 H.P.

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PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

Gray, 12 La. App. 698, 127 So. 75; Mohr v. Fabacher, Orleans No. 7590; Burk v. Rosenberg, 14 Orleans App. 324.

[1] Bruno v. Williams, 76 So. 2d 41, Court of Appeal of Louisiana.

Costs Must Be Established In Cost-Plus Contracts

"Under a cost-plus contract, the contractor is obligated to use his utmost endeavors to see that the owner gets value received. Lagasse v. Allen, 219 La. 745,746, 54 So. 2d 6. Where there is such a contract to do a job for whatever it might cost, it is implicit that the price charged will not be whatever the contractor sees fit to charge, but will be whatever may be shown to be the reasonable and proper cost. Lee v. National Cylinder Gas Co., La. App., 58 So. 2d 568."[1]

In this case, the court held that the contractor may be required to furnish a detailed statement showing the cost of each item of labor and material furnished. A statement of the alleged total cost, it said, was not sufficient.

[1] Wendel v. Maybury, 75 So. 2d 379, Court of Appeals of Louisiana, March 29, 1954.

Contract Was Changed By an Oral Agreement

It's a general rule that a written agreement cannot be modified by an oral one. But courts have made some exceptions.

One court, for example, has said: "A written contract or agreement may be altered or modified by an oral agreement if the latter has been accepted and acted upon by the parties in such manner as would work a fraud on either party to refuse to enforce it. Carter Realty Co. v. Carlisle, 113 Fla. 143, 151 So. 498,499 and authorities cited; Accord Tussing v. Smith, 125 Fla. 578, 171 So. 238; Moses v. Woodward, 109 Fla. 348, 140 So. 651, 141 So. 117, 147 So. 690."

Harris v. Air Conditioning Corp., 76 So. 2d 877, Supreme Court of Florida, Jan. 7, 1955.

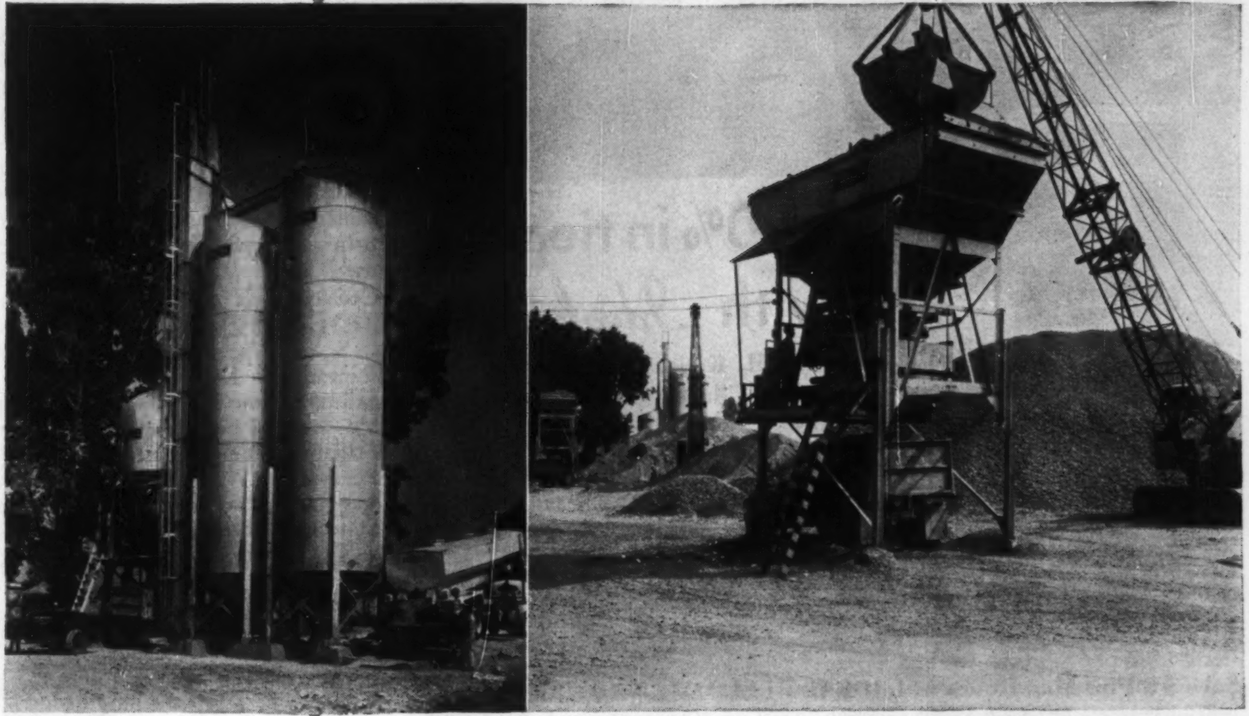
Acceptance Not a Waiver

By accepting and occupying a building the owner does not waive his rights against the contractor for damages resulting from defects in construction, where the owner at the time of accepting the building could not, with reasonable care and diligence have discovered the defects in question.[1]

[1] Svendson v. American Indemnity Co. of Galveston, 76 So. 2d 737, Court of Appeals of Louisiana, Jan. 3, 1955.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

If this Isn't the WORLD'S BATCHING RECORD ...We'd like to know it!



With a BUTLER Roadbuilders Plant as the forward passer on the team, the Sargent Construction Company — on the Ohio Turnpike — laid 4368 lineal feet of concrete pavement 24 feet wide and 10 inches thick — *in one 16 hour day.*

The BUTLER Plant dished up that volume of concrete in 2424 batches.

Slide rules, gentlemen! That's at the rate of over 2½ batches per minute. And mind you, not just for one minute, not for just 10 minutes — but steadily for 16 long, gruelling hours.

The BUTLER Plant tossed these 2424 passes to two 34E pavers working in tandem. Even the large #44 elevator sweated to keep pace with BUTLER (and Sargent) batching.

Want more statistics?

21,798 bags of cement batched in 16 hours.
3,148 tons of stone
1,695 tons of sand

Moral? If you want to establish World's Records in production and profits — go BUTLER!

BUTLER
PORTABLE BATCHING PLANTS

Want to find out about unbeatable portability in BUTLER Roadbuilders Plants? Just send a postcard for Bulletin 205. Savings of hours of downtime during moves often spell the difference between a loss or a handsome profit. Send that postcard — today.

BUTLER BIN COMPANY

947 BLACKSTONE AVE. • WAUKESHA, WISCONSIN

Saves 40% in tie wire
. . . with *Ideal Reel*

—says Milbern H. Kane, superintendent for Edgar Stephens Construction Company of Cairo, Illinois

"IDEAL REEL has many advantages over other methods of tying reinforcing steel," says Mr. Kane. "*It eliminates wire waste which we estimate saves us 40% in tie wire.* Saves time, too. Its easy use allows a man to make *at least 25% more ties.*"

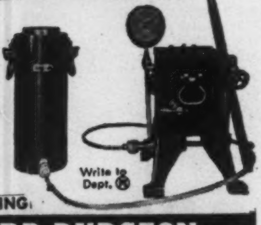
Mr. Kane also appreciates the fact that IDEAL REEL is safer and reduces the dangers of permanent eye disability and "*falling with one end of the wire tied to the steel which could cause serious injury, even death.*"

Save $ $ Plus Man Hours with IDEAL REEL. *EASY TO USE,* no training necessary. *CONVENIENT*—reel and wire always at hand, ready for instant use. *PRACTICAL*—being used successfully in diversified wire-tying applications, such as metal lathing, pipe insulation, plant maintenance, stretching lines for batter boards, shipping . . . you name it. *ECONOMICAL*—quickly pays for itself. *SAFE*—approved and recommended by leading insurance companies.

IDEAL
Tie Wire Reel
Trademark Reg. Applied For

Have *you* seen IDEAL REEL in action? If not, call your Ideal Reel Distributor for a free demonstration, or write for complete information to

Ideal Reel Co, 328 Harahan, Paducah, Ky.



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NEW CONSTRUCTION
AND REPAIRS

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- Structural Steel Encasements
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OBITUARIES

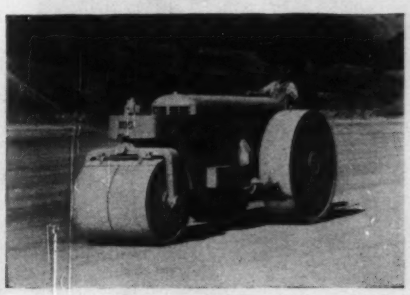
George C. Clarke, 85, civil engineer who helped build many industrial, power and railroad facilities in the U. S. and Canada, died Sept. 5 in New York City. He entered the engineering department of Pennsylvania Railroad in 1891 and rose to resident engineer in charge of construction of its New York City terminal. He also worked in Pittsburgh on the Union Station and railroad yards, and a railroad bridge over the Monongahela River. Clarke was instrumental in forming Fraser-Brace Engineering Co., Ltd., of Montreal. The Canadian phase of his career was spent in the construction of metallurgical plants, pulp and paper mills, and hydroelectric developments, including the Cedar Rapids power plant of Montreal Light, Heat & Power Co. In the U. S., he helped construct the Federal shipyards at Kearney, N. J., a dam and powerhouse at Fifteen-Mile Falls, Vt., for New England Power Co., and Federal ordnance works in Missouri, Pennsylvania and Tennessee. Clarke was graduated from Pennsylvania State College in 1891 and received a civil engineering degree there in 1902.

Cecil L. Reed, 72, retired consulting hydraulic engineer, died Sept. 3 in Charlotte, N. C. A graduate of Clemson College School of Engineering, he lived in Fredericksburg, Va., for some 40 years prior to moving to North Carolina. He was civilian engineer in charge of the construction of Ft. Bragg, N. C. Among other projects that he directed was the construction of Lake Junaluska Dam in western North Carolina.

Henry W. Kendall, 71, chief engineer for Harris Structural Steel Co., New York City, died Sept. 10. He served with the company from 1925 until his retirement in 1945. Among the projects he supervised in the New York area were the West Side Highway and Rip Van Winkle Bridge over the Hudson River.

R. A. Froehlinger, 68, president of Arundel Corporation, Baltimore, Md., died Sept. 8. He had been identified with the construction industry in Baltimore since 1911, when he became associated with Furst-Clark Construction Co. and Maryland Dredging & Contracting Co. When these two firms merged into the Arundel Corporation in 1919, he was named assistant treasurer. Many projects were built for the city under his supervision.

THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR



3-WHEEL ROLLERS

How to select compaction equipment

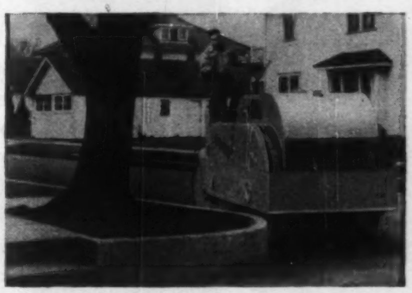
The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

FINE GRADE FINISHING—Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly-proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING—Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.

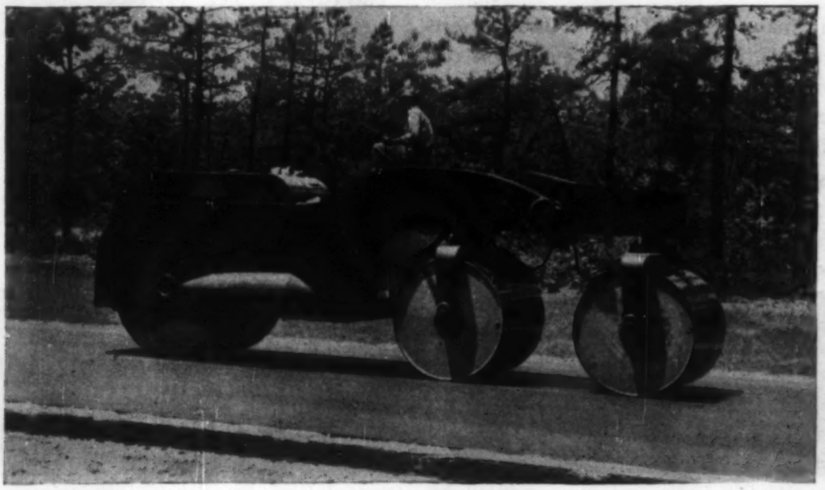


TWO AXLE TANDEMS

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light finishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.

3-5 TON PORTABLE TANDEM

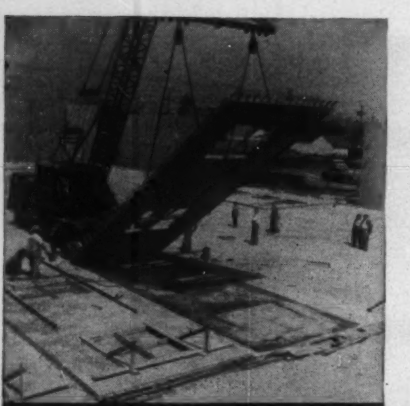
THE BUFFALO-SPRINGFIELD KX-3 AXLE TANDEM



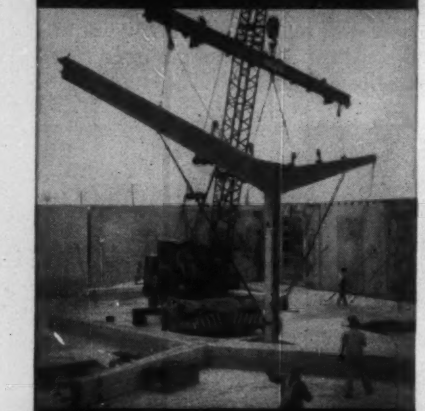
The Standard of Comparison

BUFFALO SPRINGFIELD

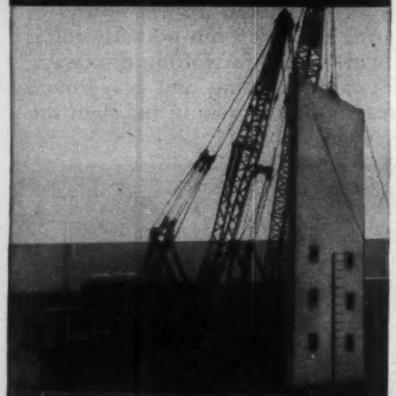
SPRINGFIELD, OHIO



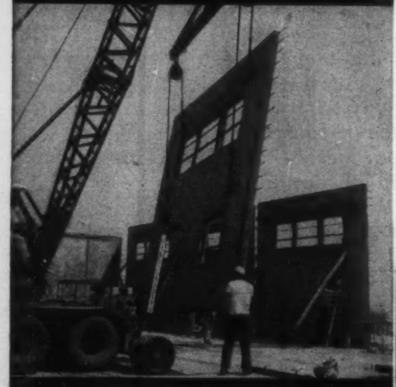
PRECAST PANEL 32' high, 18½' wide with two large window areas.



TRUSS has 60' span at top



114,000 LB. SLAB being positioned



PANEL with door and two window areas

SUPERIOR

Complete Accessories Plus Experience on Tilt-Up Jobs!

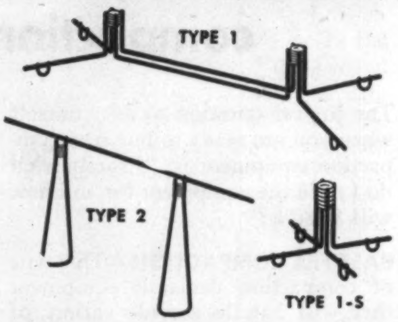
On every Tilt-Up job the proper type of Pick-Up Inserts and Brace Anchors as well as their location in the slab or precast structural member are of prime importance in order to withstand the stresses occurring when *tilting, lifting,* and *positioning.* As pioneers in this field, SUPERIOR has developed various types of accessories and correct procedures resulting from the experience of thousands of job applications.

SUPERIOR accessories are designed for fast and efficient handling of all types of precast panels and structural members. The Pick-Up Insert provides dependable anchorage for bolts which secure a lifting angle to which slings are attached when the panel is raised. Brace Anchors secure the temporary bolts by which the Braces are attached. The exclusive pivoting action of the adjustable Braces permits quick positioning and alignment of panels. Braces are assembled with 2 x 4's or pipe of lengths to fit job conditions.

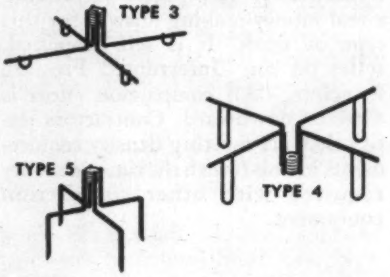
The many types of SUPERIOR Inserts, Anchors, and Braces for every job condition together with complete layout service provide a combination which offers safe and efficient handling of precast panels and structural members.

For further details refer to Sweet's Catalog or send for Bulletin TU-3.

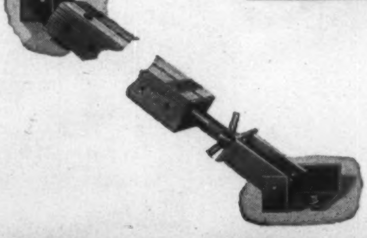
PICK-UP INSERTS



ANCHORS for BRACES



BRACES



SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St., San Leandro, Calif.

Equipment Rental, Calif.

Continued from page 224

Type of equipment	Rate/ hr
Trailers, pole type, single axle	$0.65
Pole type, tandem axle, 18-ton pay load	1.30
Float or semi, 12½-ton pay load	1.00
Full four-wheel, 12½-ton pay load	1.10
Tandem float, 30-ton pay load	3.25
Low boy carry-all, 10–15 ton capacity	1.95
20–25 ton	2.60
30–35 ton	3.25
40–60 ton	3.90

NOTE: Manufacturer's authorized maximum weight rating, or gross vehicle weight, GVW, is greatest weight of vehicle and load the manufacturer authorizes and guarantees the vehicle to accommodate with safety under normal conditions. This includes weights of chassis, cab, special equipment, body and body contents (pay load) and of largest tires authorized by manufacturer for the vehicle.
Capacity ratings for rental pricing purposes

GVW, Mlbs	tons	GVW, Mlbs	tons	GVW, Mlbs	tons
12.5–14	1½	20.5–22	3½	28.5–30	5½
14.5–16	2	22.5–24	4	30.5–44	6–9
16.5–18	2½	24.5–26	4½	46.0–62	10–14
18.5–20	3	26.5–28	5	64.0–74	15–18

(Provided that the addition of a 2-speed axle or tandem drive to standard equipment may not be used to increase GVW of unit)

Vibrators, concrete, gasoline, pneumatic or electric powered, including vibrator heads and shafting	$0.65

Welding machines, gasoline or Diesel engine driven, AC or DC, incl helmets, holders, 60 ft ground & welding cable

to & incl 250 amp	$1.00	350–500 amp	$1.75
250–350 amp	1.30	500–700 amp	2.30

when truck mounted, add rate for size of truck used
additional cable, for each 60 ft or less 0.15

Fast Equipment Depreciation

The faster depreciation methods authorized by the 1954 tax law, reported in detail ENR 7/29/54 and 9/30/54, use these formulas:

- **Declining balance method**—This permits writing off about two-thirds of original cost in the first half of machine's useful life. First you figure depreciation by the old straight-line method. Then you double the first-year write-off and apply it to the full cost of the asset. Next year you repeat this on the balance of the original cost that is left.

For example, on a $15,000 tractor with a 5-year life, the straight-line depreciation would be $3,000/yr. Under the declining balance method it would be double that the first year or $6,000. The second year allowable straight-line depreciation on balance would be ⅕th of $9,000 or $1,800, thus the declining balance depreciation would be $3,600. And so on.

- **Sum-of-the-years'-digits method**—This allows you to write off about ¾ths of the original cost in the first half of useful life. It also permits complete recovery of original cost compared with an unrecovered 8-13% under declining balance formula. It works like this:

Say the machine has a 5-year life, the first year is 5/15. Here the numerator is the remaining useful life, the denominator is the sum of the years' digits for the original useful life—in this case $1+2+3+4+5=15$. In the 2nd year the rate is 4/15, in the 3rd, 3/15 and so on.

For XTRA COVERAGE

Specify ®TAPECOAT-X

...the time-tested quality coal tar coating in tape form...now made with Xtra thickness of coal tar to go farther, faster *on pipe, pipe joints, fittings, mechanical couplings, tanks and other surfaces vulnerable to corrosion.*

TAPECOAT-X METHOD
(applying 30 feet of TAPECOAT-X)
With the new Xtra thickness of coal tar, effective protection is assured by using a single-wrap in spiral form, with an overlap of only ½".

USUAL METHOD
(applying 30 feet of regular tape)
For effective coverage by the usual double-wrap method, it is necessary to overlap the tape slightly more than half its width.

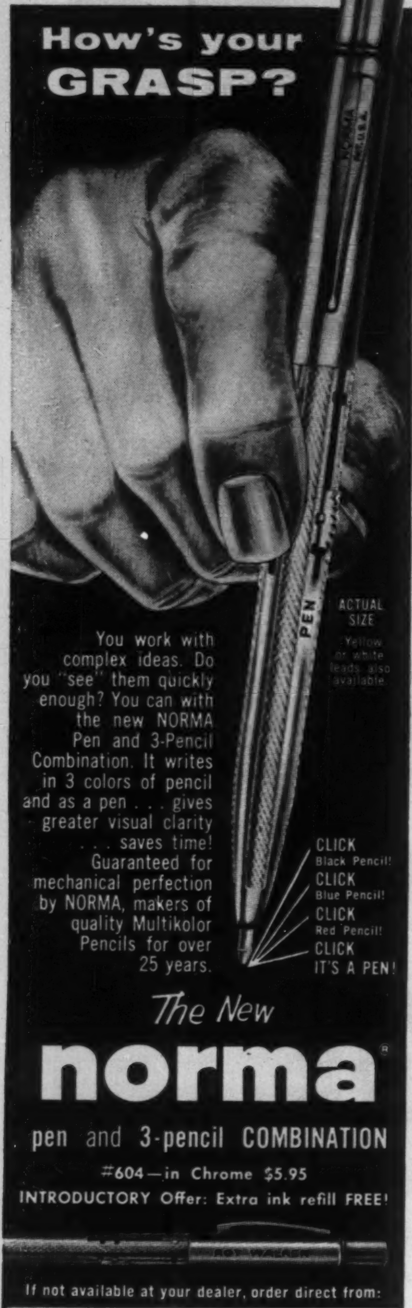
See how the Xtra thickness of coal tar built into TAPECOAT-X provides extra protection per foot of tape. This extra thickness of coal tar, made possible by a new exclusive process, permits a single-wrap application that can be applied faster and over a greater area for savings in labor, material, time and money.

These and other practical advantages make it worth your while to get the complete details on TAPECOAT-X.

Write for literature today

The TAPECOAT Company
ORIGINATORS OF COAL TAR COATING IN TAPE FORM

1551 Lyons St., Evanston, Illinois


AS AN ENGINEER

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CONSTRUCTION REPORTS — First Section

Bids Asked—Low Bidders—Contracts Awarded

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager

J. A. MAHONEY, M. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Mass., Beverly—FIRE STATION—BA 10/4—City, Central Fire Station, Hale St., fire station, Beverly Farms. $102,000. Mahoney Assoc., 72 Loring Ave., Salem, archts.

† **Massachusetts**—BUILDINGS for SPECIAL AAA FACILITIES—BA On Or About 10/6—U. S. Eng., 857 Commonwealth Ave., Boston, Zone 15, constr. addnl. bldgs. for Special AAA Facilities in Boston area, located at following locations: (a) Site B-03 Reading control and launcher areas, (b) Site B-17 Nahant control and launcher areas, (c) Site B-36 Hog Island control area and Weymouth launcher area, (d) Site B-37 Squantum control area and Long Island launcher area, (e) Site B-55 Blue Hills control and launcher areas, (f) Site B-63 Needham control and launcher areas, (g) Site B-73 Lincoln control area and Wayland launcher area, (h) Site B-84 Burlington control and launcher areas. $150,000-$200,000. Plans deposit $10. CD 3/29.

HEAVY CONSTRUCTION—LB & CA

MAINE—State Hy. Comn., State House, Augusta,
Forest Frederick, Pittsfield, Me. LB **$265,825.** b. conc. 3.617 mi. F.A. Secondary Proj. S 0298-(4), "298" Franklin and Twp. 9 S. D. Bids Sept. 14. CD 9/7.

† **Seaward Constr. Co., Inc.**, Badgers Island, Kittery, Me. LB **$175,310,** est. $180,000. electrical distr. lines for tactical facilities, Loring Air Force Base, ENG-19-016-56-27, LIMESTONE, ME. U. S. Eng., 857 Commonwealth Ave., Boston, Mass.

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., State House Annex, Concord,
Cooke-Ross, Inc., 70 Main St., Torrington, Conn. LB **$284,408,** Class C-2 road mix hy. 2.502 mi. and 25 ft. rein.-con. frame bridge, Stratford. Bids Sept. 15. CD 9/8.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Farina Bros. Co., 429 Watertown St., Newton, Mass. CA **$5,469,289,** est. $5,500,000. grade crossing elimination Mill and Norman Sts., Salem. CD 8/12, under LB.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
John McCourt Co., 910 Huntington Ave., Boston, Mass. LB **$112,765,** est. **$120,000.** hy. work Dorchester St., South Boston. Bids Sept. 13. CD 9/8.

AAA Constr. Co., 1135 Plainfield St., Johnston, R. I., LB **$138,000,** est. $140,000. R. I. Proj. No. 1, 2, constr. and finish site alterations, Roger Williams Homes, PROVIDENCE, R. I. City Housing Auth., 263 Chad Brown St., Providence, R. I. CD 3/7/50, under Public Buildings .

▲† **The Associated Constr. Co.**, 1010 Wethersfield Ave., Hartford, Conn., CA, **$792,726,** Contract A, CA, **$956,277,** Contract C, Special AAA Facilities East Windsor, Manchester, Glastonbury and Cromwell, Middletown, Hartford Area, ENG-19-016-54-6, CONNECTICUT. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Grand total $2,552,112. Bids Sept. 7. CD 9/13, under LB.
Wexler Constr. Co., 118 Needham St., Newton Highlands, Mass., CA, **$803,115.** Contract B (Connecticut).

BUILDINGS—LB & CA

▲ **J. F. Rand & Sons**, 57 Sudbury St., Boston, Mass. LB **$1,170,383.** Acton-Foxboro Regional HIGH SCHOOL, ACTON, MASS. Acton-Foxboro Regional High School Dist., Supt. Schools, High St., Acton, Mass. Bids Sept. 14. CD 8/23.

Park Constr. Co., Inc., 40 Court St., Boston, Mass. CA **$641,000.** M-402 Contr. 1, SERVICE BLDG. addn., Walter E. Fernald State School, Waverly (Section Belmont), WALTHAM, MASS. State, Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. CD 8/17, under LB.

DelSignore Constr. Corp., 1 Pleasant View St., Worcester, Mass. CA **$589,987,** est. $600,000. M-504 Contr. 1, REFRIGERATION KITCHEN and CAFETERIA alterations, WORCESTER, MASS. State, Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Thomas T. Amirian, 31 St. James Ave., Boston, Mass., struct. engr. CD 8/10, under LB.

J. H. Hogan, 78 Butler St., New Haven, Conn., CA Est. **$600,000.** Basset Junior High SCHOOL addn., NEW HAVEN, CONN. City, Justin L. O'Brien, supt. Schools, 169 Church St., New Haven, Conn. Bids Aug. 15. CD 9/13, under LB.

▲ **The Wadhams & May Co.**, 15 Lewis St., Hartford, Conn., LB, **$2,236,004.** Contr. 54-C-405 AA, HIGH SCHOOL, South Elm St., WALLINGFORD, CONN. Town, c/o Supt. Schools, at Moses Y. Beach School, Wallingford, Conn. Bids Sept. 13. CD 8/12.

Giuca Constr. Co., 1170 Farmington Ave., West Hartford, Conn., CA, **$140,000.** PLANT, WEST HARTFORD, CONN. Oil Heat & Eng. Co., 692 Maple Ave., Hartford, Conn. Kirk Fletcher Richetts, 462 Ridge Rd., Wethersfield, Conn., archt.

▲ **Fusco-Amatruda Co.**, 59 Amity Rd., New Haven, Conn., CA, **$1,289,000.** Harry M. Bailey Junior HIGH SCHOOL, WEST HAVEN, CONN. Bd. Educ., Town Hall, West Haven, Conn. Bids Aug. 31. CD 9/7, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

New York—BA 10/4—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Contr. I-T-16, installation of barminutor in grit chamber, Tallmans Island Pollution Control Proj., Queens Boro. Plans deposit $10.

▲ **New York**—BA 10/4—New York City Transit Auth., 370 Jay St., Brooklyn, Zone 1, DeKalb Avenue reconstr. (revised) general constr. Sections 1 and 2 in Brooklyn Boro, Contr. C-102. Bids 8/26 rejected. CD 9/9, under LB.

D. C., Wash.—BA 10/5—D. C. Govt., Dpt. Hys., 499 Pennsylvania Ave., N.W., constr. 2 bridges over Watts Branch at 44 St. and Gault Pl. N.E. Plans deposit $20.

Md., Rockville—BA 10/5—Montgomery Co. P. Wks. Office, M. A. Butcher, dir., County Office Bldg., Contr. S-693, drainage facilities along Lawndale Drive and Flower Ave. in Indian Spring Estates. Plans deposit $5.

▲† **N. Y., Plattsburgh**—AIRFIELD FACILITIES—BA 10/13—U. S. Eng., 111 E. 16 St., New York, Zone 3, airfield facilities, package No. 1, grading, POL facilities at Plattsburgh Air Force Base, ENG-30-075-56-92. $1,000,000-$1,500,000. Plans deposit $10. CD 7/-16/54.

† **N. Y., Plattsburgh**—SHOP—BA 10/13—U. S. Eng., 111 E. 16 St., New York, Zone 3, base maintenance shop addn., Plattsburgh Air Force Base. $100,000-$500,000. CD 9/14.

N. Y., Mineola—BA 10/18—Nassau Co. Executive, Old County Court House, lateral sewers at New Hyde Park, Stewart Manor and vicinty, towns of Hempstead and North Hempstead, sewage collection Dist. No. 2-NHP, Contr. No. 1002-2NHP-1. Plans deposit $25. CD 6/13.

† **Md., Andrews Air Force Base**—OPERATIONS AND TRAINING BLDG.—BA On Or About 10/20—U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C., air national guard operations and training bldg., ENG-49-080-56-17-(18). CD 8/9/54.

PROJECTS COVERED

By Size

Construction projects here reported cover the Unite States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings, $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listings)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildnigs
Industrial Buildnigs
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

BUILDINGS—BA

Md., Baltimore—SCHOOL—BA 10/5—City, Bureau Bldg. Constr., 410 Municipal Bldg., Zone 2, 1 and 2 story, addn. to Glenmount School No. 235, Glenmore, Walther and Ina Aves. $500,000. Plans deposit $50. F. L. W. Moehle & Assoc., 2514 N. Charles St., Zone 18, archts. CD 4/1/52.

▲ **N. Y., Brooklyn**—COURT BLDG.—BA 10/5—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, Contr. B1 general constr., Contr. B2 plumbing work, Contr. B3 heating and ventilating work, Contr. B4 electrical work for constr. of new supreme court bldg., Brooklyn Civic Center, Phase B, Plans deposit $100. Extended date. CD 8/11.

N. Y., New York—SCHOOL—BA 10/10—Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, modernize and convert P. S. 82, Macombs Rd. and W. 176 St. The Bronx, to Junior High School. Plans deposit $15 general constr., $8 plumbing and drainage, $5 heating and ventilating, $7 electrical work and lighting fixtures.

N. Y., New York—DORMITORY—BA 10/10—Manhattan College, at office Eggers & Higgins, archts., 100 E. 42 St., student dormitory. CD 5/3.

▲ **N. Y., New York**—SCHOOL—BA 10/18—Bd. Educ., Bureau Constr., 42-15 Crescent St., Long Island City, Zone 1, P. S. 64, 9th St. and Ave. B, Manhattan, modernization and conversion to Junior High School, $1,094,000. Plans deposit $10 general, $8 each plumbing & drainage, heating & ventilating, electrical & lighting fixtures. CD 3/2.

▲ **N. Y., Brooklyn**—HOSPITAL—BA In 2 to 3 weeks—Methodist Hospital of Brooklyn, 6 St. and Seventh Aves., (selected list bidders), hospital, Sixth St. adjacent to existing. bldg. $4,000,000, Slocum & Fuller, 207 E. 32 St., New York, Zone 16, consult. engrs. Rogers & Butler, 219 E. 44 St., New York, Zone 17, archts. CD 5/26.

BUILDINGS—LB & CA

▲ **Lightning Electric Service Co.**, 11 Coes Place, Newark, N. J. and **Fischbach & Moore, Inc.**, 226 E. 41 St., New York, N. Y. CA **$2,271,500.** 3 mi. continuous fluorescent lighting in Third Tube of Lincoln Tunnel, NEW YORK-NEW JERSEY. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. CD 1/18/54.

▲ **NEW YORK**—Bureau Contracts & Account, The Gov. Alfred E. Smith State Office Bldg., Albany,

N. Y.—Johnson, Drake & Piper, Inc., 86 Trinity Pl., New York 6, N. Y. CA **$3,547,010**, est. $4,950,000. (8 bidders) New York State Thruway-Erie Sect.-subd. E-1B (Barden Rd. to Westfield) and 5 marginal or cross roads 5.32 (acc. 1.94) mi. E. T. 55-4, S. T. 55-6, Chautauqua Co.;

N. Y.—Louis Mayersohn, 36 State St., Albany, N. Y. CA **$664,853**, est. $727,000. (5 bidders) Gouverneur-Edwards Pts. 1 and 2, S. H. 1263-1389, 3.96 mi. FARC 55-70, St. Lawrence Co. Bids Aug. 25, awarded Sept. 7. CD 8/31, under LB.

Charles F. Vachris, Inc., 9024 Ditmas Ave., Brooklyn, 36, N. Y. LB **$519,200** (6 bidders) Contr. B. P. 55-51 Part III, beach protection (4 stone groins) at Atlantic Beach, town of Hempstead, Nassau Co., NEW YORK. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Sept. 15, CD 8/29;
Peter Bistrian, Abrams Landing Rd., Amagansett, N. Y. LB **$81,000** (7 bidders) Contr. BP. 55-34A, beach protection (exten. of stone groins) Troy and Clayton Aves., East Atlantic Beach, town of Hempstead. (New York).

▲ **Gull Contg. Co., Inc.**, 33-15 Lawrence St., Flushing, N. Y. CA **$1,717,627.** Contr. LT-160.020 Lincoln Tunnel Third Tube N. Y. Approach Section No. 2, NEW YORK. Port of New York Auth., 111 8th Ave., New York 11, N. Y. CD 7/27, under LB.

▲† **Great Lakes Dredge & Dock Co.**, Morgan Bldg., Buffalo, N. Y. LB **$1,298,491**, est. $1,276,336. Buffalo Harbor Deepening Proj., CIVENG-30-023-56-4, NEW YORK. U. S. Eng., Engineer Park, Niagara and Bridge Sts., Buffalo, N. Y. Bids Sept. 8. CD 8/10.

Harmel Constructors, Inc., 60 E. 42 St., New York, N. Y. CA **$98,476.** two bldgs. for storage of flammable materials adjacent to Hangers 1 and 2 in northern section of New York International Airport, IDLEWILD, N. Y. The Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Aug. 16 CD 7/19.

Slattery Rock Corp., 46-36 54 Rd., Maspeth, N. Y. LB **$419,750.** (2 bidders) replacement of beach sand and exten. of riprap jetty at Orchard Beach, Pelham Bay Park, Bronx Boro, Contr. X-39-255, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids Sept. 14. CD 9/8.

Teller Paving & Contg. Corp., 389 E. 167 St., New York 56, N. Y. LB **$256,000.** playground and completion of ballfields in area from Metcalf Ave. to Bronx River between Randall and Lafayette Aves. Soundview Park, Bronx Boro, Contr. X-118-154, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids Sept. 16. CD 9/8.

(Continued on page 324)

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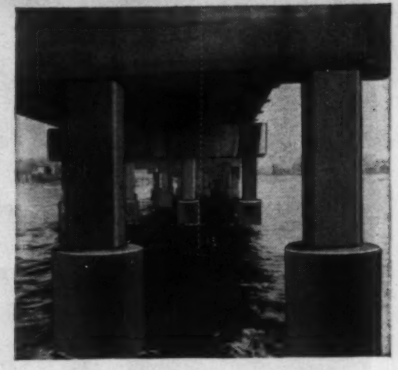

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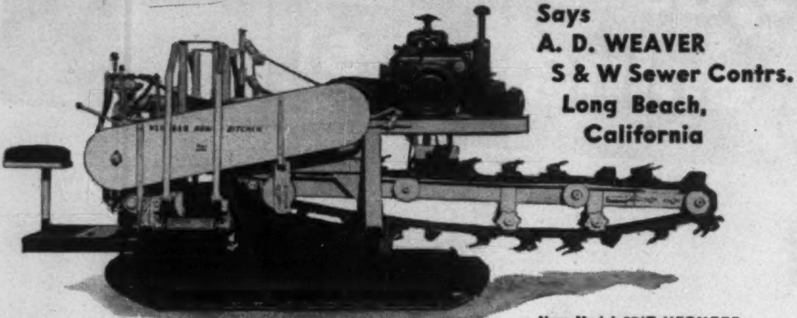
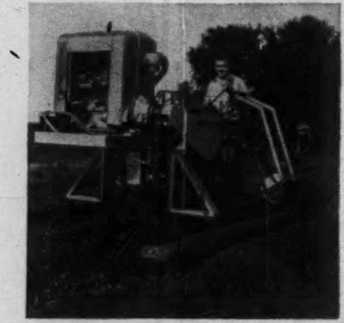

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(Continued from page 321)

† **Gilford Electrical Contractors,** Front Royal, Va. LB **$117,094.** electrical distr. sys., street lighting sys. ENG-49-080-56-8-(8), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C. Bids Sept. 13. CD 8/12.

Zephyr Constr. Co., 7412 New Utrecht Ave., Brooklyn, N. Y., CA, **$744,000.** Contr. HP-102.008, rehabilitation of superstructure of Pier 3, Hoboken Port Authority Piers, HOBOKEN. N. J. The Port of New York Auth., 111 Eighth Ave., New York 11, N Y. Bids Aug. 30, awarded Sept. 15. CD 9/1, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,
Frank Donatelli & Co., Inc., Broad St. and Euclid Ave., Pittsburgh 6, Pa. CA **$2,779,707.** wid'n. surf. 6.92 mi. 50 ft. width extension of ten existing structures, divided hy. and other imprvs., between Pittsburgh and Export, T. R. U. S. 22, Allegheny Co. CD 8/17, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office. Bldg., Harrisburg,
Buckley & Co., Inc., 1317-21 S. Juniper St., Phila. 47, Pa. CA **$1,718,453.** constr. 2-span continuous half-through plate girder railroad bridge, alteration and exten. bridge with one simple and two continuous deck girder spans, constr. and maintenance of temporary railroad detour track, disposal of excavated materials and constr. of appurtenant drainage system from Schuylkill Expressway to Arch St., city of Philadelphia, L. R. 67057, Philadelphia Co. CD 8/31, under LB.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
Md.—**Richard F. Kline,** Box 665, Frederick, Md. LB **$333,026.** grading, drainage, relocation 2.049 mi. U.S. Rte. 219 from Penna. Line, Contr. G. 268-1-620, Garrett Co.;
Md.—**McGuire & Rolfe, Inc.,** 1401 First St. S.E., Wash. 3, D. C. LB **$157,469.** surf. 2.53 mi. dual hy. along U.S. Rte. 301, White Plains to Ward Lyons Corner, Contr. CH 257-13-520, Charles Co. Bids Sept. 13. CD 9/7 and 9/8.

Square Constr. Co., 115 S. Haven St., Baltimore, Md. CA **$714,500.** furnishing, installing Canton 48 in. transmission main, BALTIMORE, MD. City, Bureau Water Supply, 503 Municipal Bldg., Baltimore 2, Md. CD 9/13, under LB.

Hoffman & Bishop, 338 E. 25 St., Baltimore 18, Md. LB **$96,000.** 1 story, 23x146x222 ft. brick, steel WAREHOUSE, 1400 block Russell St., BALTIMORE, MD. Andrew Realty Co., Inc., 2025 Worcester St., Baltimore, Md. Fenton & Lichtig, 2219 Maryland Ave., Baltimore 18, Md., archts.

DELAWARE—State Hy. Dpt., Dover,
Del.—**Melvin L. Joseph Constr. Co.,** Georgetown, Del., LB **$81,277.** Contract 1391, Clarksville to Millers Neck. 4.744 mi., Sussex Co.; LB **$78,563.** Contract 1395, County Rd. 277, S-191 (1), Sussex Co.;
Del.—**George & Lynch, Inc.,** Delaware Trust Bldg., Wilmington, Del., LB, **$168,621.** Contract 1385, 0.971 mi. Veale Rd., Kent Co.;
Del.—**James Julian, Inc.,** 405 Du Pont Rd., Elsmere, Del. LB, **$84,175.** c. conc. patching Contract 1426 Sussex Co. Bids Sept. 14. CD 8/29.

BUILDINGS—LB & CA

Cedar Ridge at Bethpage Park Homes, c/o Rudolph A. Matern, archt., 90-04 161 St., Jamaica, N. Y. Owner Builds. **$400,000.** 25 HOUSES on tract on Haypath Rd. east of Plainview Rd., BETHPAGE, N. Y.

▲ **Lawrence D. Elkind,** c/o Stanley J. Shaftel, archts., 166-21 90 Ave., Jamaica, N. Y. Owner Builds. **$13,000,000.** 862 HOUSES, on 340 acre tract on Rutledge and Hancock Sts. between Washington and Grant Aves., BRENTWOOD, N. Y.

Klevens Corp., 3 Federal St., Yonkers 5, N. Y. CA Est. **$375,000.** 2 story LOADING TERMINAL, 11-14 West St., BROOKLYN, N. Y. All States Terminal Corp., 16 Court St., Brooklyn 2, N. Y. CD 4/7.

John W. Cowper Constr. Co., 775 Main St., Buffalo, N. Y. LB **$648,700.** LAUNDRY, Buffalo State Hospital, BUFFALO, N. Y. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. CD 8/16, under LB.

Chestnut Hill Homes, c/o Stanley Klein, archt., 89-31 161 St., Jamaica, N. Y. Owner Builds. **$350,000.** 25 HOUSES on tract at South Main St. and Carmans Rd., FARMINGDALE, N. Y.

Lancaster at Fresh Meadows, Inc., c/o John Burton & Assoc., archts., 163-18 Jamaica Ave., Jamaica, N. Y. Owner Builds. **$450,000.** 45 HOUSES, 174 St. south of 59 Ave., FLUSHING, N. Y.

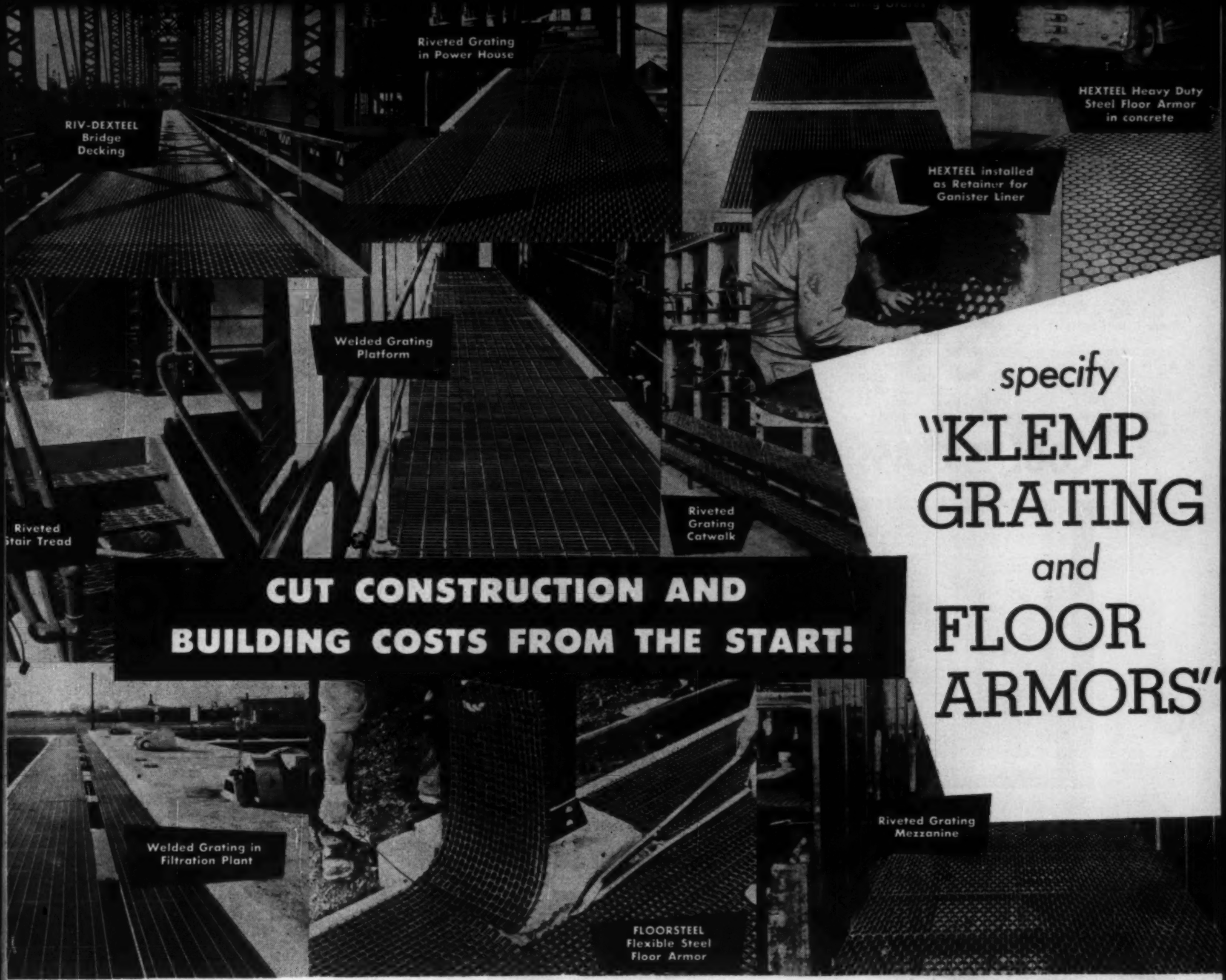
▲ **Milford Estates Homes,** c/o Nassau Homes Sales Agency, 1 N. Merrick Ave., Merrick, N. Y. Owner Builds. **$1,000,000.** 54 HOUSES on 18 acre tract at Dosoris Lane, GLEN COVE, N. Y.

▲ **Hampton Waters Homes,** c/o Nassau Homes Sales Agency, 1 N. Merrick Ave., Merrick, N. Y. Owner Builds. **$5,000,000.** 450 HOUSES, boat basin, STORES, cabanas, tennis courts on 250 acre tract on Oyster Shores Rd., HAMPTON BAYS, N. Y.

Jackson Heights Corp., c/o A. H. Salkowitz, archt., 87-25 Homelawns St., Jamaica 32, N. Y. Owner Builds. Est. **$495,000.** 45 HOUSES, 78 St. between 29 and 31 Aves., JACKSON HEIGHTS, N. Y.

▲ **George A. Fuller Co.,** 597 Madison Ave., New York 22, N. Y. CA Est. **$1,000,000.** OFFICE alterations, NEW YORK, N. Y. Columbia Pictures Corp., 711 Fifth Ave., New York 22, N. Y. CD 6/30.

(Continued on page 326)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RIV-DEXTEEL Bridge Decking
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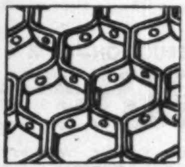

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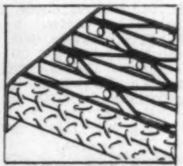

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(Continued from page 324)

Unity Sheet Metal Works, Inc., 167 Christopher St., New York, N. Y. LB **$110,000.** re-roofing the admin. primate and ostrich bldgs. at New York Zoological Park, Bronx Boro, Contr. X-2-1054, NEW YORK, N. Y. Comr. Parks, Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and Fifth Ave., New York 21, N. Y. Bids July 26. CD 7/18.

▲ **Scarsdale Woods Homes**, c/o Rellstab Associates, Inc., 23 Popham Rd., Scarsdale, N. Y. Owner Builds. **$1,500,000.** 47 HOUSES, on tract near Black Birch Lane, SCARSDALE, N. Y.

Smithtown Greens Homes, c/o Klein & Parker Realty Co., 1391 Northern Blvd., Roslyn, N. Y. Owner Builds. **$360,000.** 30 HOUSES on tract on Hallock Ave. south of Jericho Turnpike, SMITHTOWN, N. Y.

Old Mill Park Homes, c/o C. J. Kordys, archt., 116 Passaic St., Passaic, N. J. Owner Builds. **$360,000.** 20 HOUSES on tract at Kings Hy. west of Rte. 303, TAPPAN, N. Y.

Cedar Lane Estates, c/o B. J. Bergton, 55 Cedar Lane, Teaneck, N. J. Owner Builds. **$600,000.** 30 HOUSES, Cedar Lane, west of Knickerbocker Rd., CLOSTER, N. J.

▲ **The Glenwal Co. Inc.**, State Hy. 46, Saddle River Twp., N. J. CA, **$1,129,279.** HIGH SCHOOL, FRANKLIN LAKES, N. J. Ramapo Regional High School District, James Heath, pres. School Bldg., Franklin Lakes, N. J. Bids Aug. 16. CD 7/29.

Hillside Estates Homes, c/o Erwin Gerber, 1180 Raymond Blvd., Newark, N. J. Owner Builds. **$600,000.** 31 HOUSES, Pascock Rd., south of Washington Ave., HILLSDALE, N. J.

Colwill Constr. Co., 2114 Maryland Ave., Baltimore 18, Md. CA **$515,375.** 1 story, steel, masonry, H-shaped central STORAGE and KITCHEN, Spring Grove State Hospital, CATONSVILLE, MD. State Dpt. P. Imprvts., 506 Park Ave., Baltimore 1, Md. CD 8/10, under LB.

Perryland Corp., 3214 Brooklawn Terrace, Chevy Chase, Md. Owner Builds. **$572,000.** 52 HOMES, Tilton Dr. and Belvedere Blvd., SILVER SPRING, MD. Jack Cohen, 7961 Eastern Ave., Silver Spring, Md., archt.

D. C. Govt., Dir. Bldgs. & Grounds, 499 Pa. Ave. N. W. Wash., D C,, rejected bids Aug. 16, Shepherd SCHOOL Addn., 14 St. and Kalmia Rd. N. W., WASH., D. C. LB **$365,000.** CD 8/24, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

† **Tennessee**—BA 10/5—U. S. Eng., P. O. Box 97, Memphis Zone 1, 17,480 lin. ft. channel imprv. and 2,275 lin. ft. new ditch for Running Reelfoot Bayou, Item No. L-841D, Miston, to incl. approx. 686,000 cu. yd. excav., Dyer Co. CIVENG-40-041-56-35.

Va., Norfolk—BA 10/10—Hampton Roads Sanitation District Comn., Bd. of Trade Bldg., combined sewage pumping station and office bldg., incl. connecting gravity, by-pass and force main sewer lines at corner of Plume and Atlantic Sts. Plans deposit $40. Buck, Seifert & Jost, 112 E. 19 St., New York 3, N Y., consult. engrs., adv. ENR 9/29.

† **N. C., Goldsboro**—WING HEADQUARTERS, etc.—BA About 10/17—U. S. Eng., 308 Customhouse, Wilmington, wing headquarters and headquarters, Group Air Base. Seymour Johnson Air Force Base, ENG-31-075-56-20. Plans deposit $8.

† **Louisiana**—BA 10/18—U. S. Eng., P. O. Box 60, Vicksburg, Miss., approx. 688,000 cu. yd. earthwork on west bank of Mississippi River in East Carroll Parish. CD 6/26/46.

† **N. C., Goldsboro**—SEWAGE TREATMENT PLANT—BA About 10/19—U. S. Eng., 308 Customhouse, Wilmington, rehabilitation sewage treatment plant, Seymour Johnson Air Force Base, ENG-31-075-56-16. Plans deposit $5.20.

† **N. C., Fort Bragg**—WAREHOUSE—BA About 10/27——U. S. Eng., 308 Customhouse, Wilmington, bulk storage warehouse, Pope Air Force Base, ENG-31-075-56-12. CD 9/2, under LB.

† **N. C., Goldsboro**—AIRMENS CLUB—BA About 10/28—U. S. Eng., 308 Customhouse, Wilmington, rehabilitation exterior of airmen's club, Seymour Johnson Air Force Base, ENG-31-075-56-26. Plans deposit 80c.

BUILDINGS—BA

Ky., Louisville—WAREHOUSE—BA 10/5—General Electric Co., Appliance Park, Louisville, superstructure North warehouse addn., Benchel, $900,000, Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., archt. Fairbrother & Miehls, 345 New Center Bldg., Detroit, Mich., engrs. CD 5/23/51.

† **N. C., Southport**—FAMILY HOUSING—BA About 10/18—U. S. Eng., 308 Customhouse, Wilmington, family housing, (A) two (1 duplex bldg.) 2,300 sq. ft. colonel's quarters, (B) two (1 duplex bldg., 2,300 sq. ft.) company grade officer units, (C) 1,200 sq. yds. roads, (D) utilities, (E) misc. items, ENG-31-075-56-19. Plans deposit $6.80.

† **Ala., Birmingham**—ARMORY, etc.—BA On Or About 10/25—U. S. Eng., Mobile, Ala., one 2 story approx. 23,500 sq. ft. O. R. C. Armory bldg.; approx. 6,095 sq. ft. motor vehicle storage shed, ENG-01-076-56-21. CD 6/30.

† **S. C., Myrtle Beach**—SECURITY BLDG., etc.—BA About 10/25—U. S. Eng., Customhouse, Charleston, security, control and identification bldg., Myrtle Beach Air Force Base, ENG-38-081-56-4. CD 9/19.

† **La., Lake Charles**—CHAPEL—BA 10/26—U. S. Eng., P. O. Box 1229, Galveston, Tex., educational wing to chapel at Lake Charles Air Force Base, ENG-41-243-56-17, $100,000. CD 8/25.

Ga., Appling—SCHOOLS—BA 11/1—State School Bldg. Auth., Kemper Bldg., 41 Exchange Pl. S.E., Atlanta, Harlem Elementary & High School (addns.),Appling Colored Elementary High School, Evans Elementary & High School, Harlem Colored Elementary School, Grovetown Elementary School addn. and mechanical remodeling, Phinizy Elementary School, Appling Elementary School and Evans Elementary School. Plans deposit $50. Kuhlke & Wade, 16 Campbell Bldg., Augusta, archts.

BUILDINGS—SLC

Ky., Louisville—LAUNDRY—General Electric Co., Appliance Park, Louisville, soon lets contract 1 story, steel, concrete, brick home laundry, Benchel, **$500,000.** Hartstern, Louis & Henry, McDowell Bldg., archts. CD 5/23/51.

HEAVY CONSTRUCTION—LB & CA

Middle States Asphalt Corp., Ashland, Ky., LB, **$642,696** resurf. 36 streets, HUNTINGTON, W. VA. City, City Hall, Huntington, W. Va. Bids Sept. 10 CD 8/31.

SOUTH CAROLINA—State Hy. Dpt., Hotel Jefferson, Columbia,

S. C.—**Santee Constr. Co., Inc.**, Walterboro, S. C., LB **$84,223,** (7 bidders) bit. surf. 7.067 mi. Road 44, S. C. Docket No. 8.319. F. A. Proj. No. S-754 (1), Berkeley Co.;

S. C.—**Peden Constr. Co. Inc.**, 52 Mayberry St., Greenville, S. C., LB **$413,872** (7 bidders), bit. surf. 5.157 mi. US Rte. 29, S. C. Dockets Nos. 23.371 and 23.372, F. A. Proj. Nos. F-FG-2600 (3), F-2600 (1), Part 1 and F-FG-2600 (4), Greenville Co.;

S. C.—**Sharp Constr. Co. Inc.**, Turbeville, S. C., LB **$78,523,** (4 bidders) bit. surf. 6.598 mi. Roads 131, 193, 218 thru 225, 228 thru 231, 2341, 235 and 128, S. C. Dockets Nos. 26.336 and 26.338. F. A. Proj. No. F-924 (1), Horry Co.;

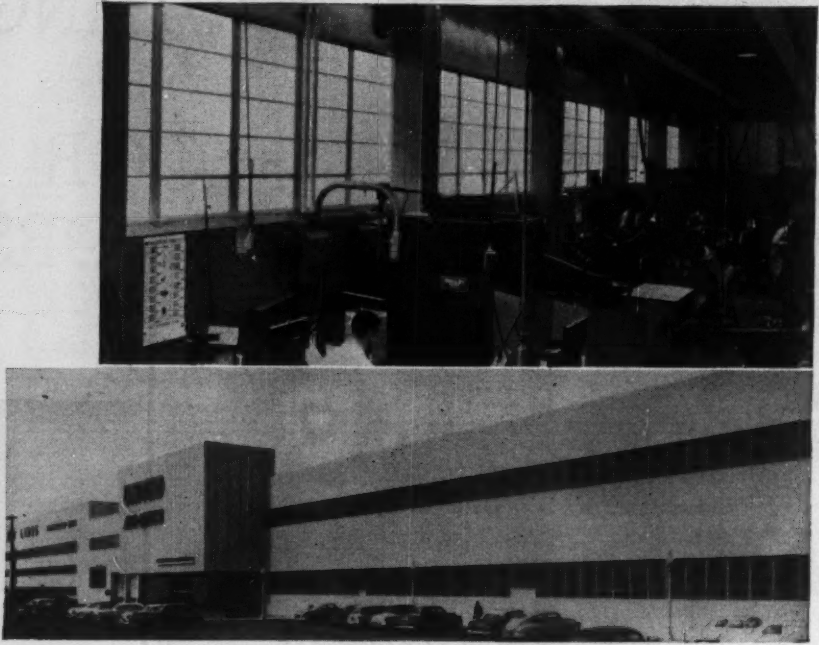
S. C.—**W. M. Reagan & Sons, Inc.**, Sumter Hy., Columbia, S. C., LB **$100,518** (7 bidders) bit. surf. 9.233 mi. Roads 57, 56 and 13, S. C. Docket No. 28.334, F. A. Proj. No. S-184 (2), Kershaw Co. Bids Sept. 13. CD 9/6.

† **Clemens Constr. Co.**, West Palm Beach, Fla., LB, **$904,300.** Levee 6, Central & Southern Florida Flood Control Proj., CIVENG-08-123-56-6, Broward and Palm Beach Counties, FLORIDA U. S. Eng., P. O. Box 4970 Jacksonville, Fla. Bids Sept. 7. CD 8/2.

▲† **Port Constr. Co.**, 3664 Old St. Augustine Rd., Jacksonville, Fla., CA **$1,114,499.** storage facilities, ordnance area, Homestead Air Force Base, ENG-08-123-56-12, HOMESTEAD, FLA. U. S. Eng., P. O. Box 497, Jacksonville, Fla. Bids Aug. 23. 8/30, under LB.

(Continued on page 329)

COOLITE GLASS HELPS KEEP 'EM FLYING



Building design by J. H. Brunnier, Engineers; General Contractor, Barrett & Hilp; Glass and Glazing, Habenicht & Howlett

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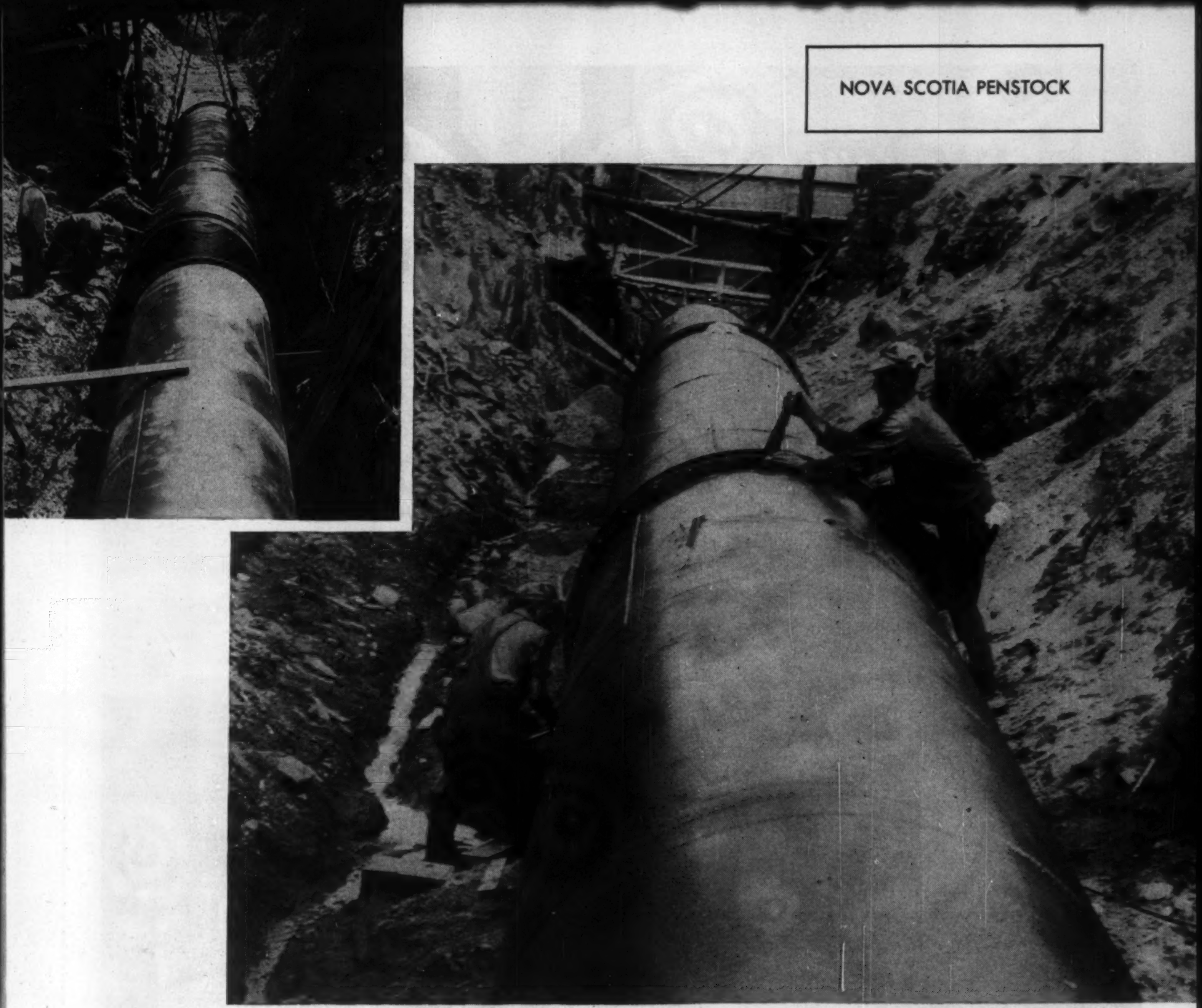

Engineered and installed by the Nova Scotia Power and Light Company, Ltd., this 66″ line was covered from 4′ to 17′ deep. Pipe was made by Halifax Ship Yard; pipe and couplings were bituminous coated. Wall thicknesses range from $\frac{3}{8}$″, $\frac{1}{2}$″, $\frac{9}{16}$″ to $\frac{5}{8}$″ for line pressures of up to 195 psi.

BIG JOB, SMALL WRENCH

From a reservoir served by the Nictaux River, 100 miles southwest of Halifax, water now flows via canal and wood stave pipe to this 3312′ Dresser-Coupled steel penstock.

The lighter weight, high-strength steel pipe was delivered to the job with Dresser Coupling middle rings and followers already in place. It was a simple matter to swing the long pipe lengths into the ditch. Then workmen put in the bolts and tightened the end nuts. *A wrench was the only joining tool required.*

That's how it is on all Dresser-Coupled jobs. No expensive skills or equipment are needed. Work can proceed in any weather at an average of only two man-minutes per bolt. And there's no need for exact pipe fitting or alignment. The resilient rubber gasket in every Dresser Coupling absorbs line stresses, strains and movement . . . permits expansion and contraction . . . keeps joints bottle-tight and trouble-free for life!

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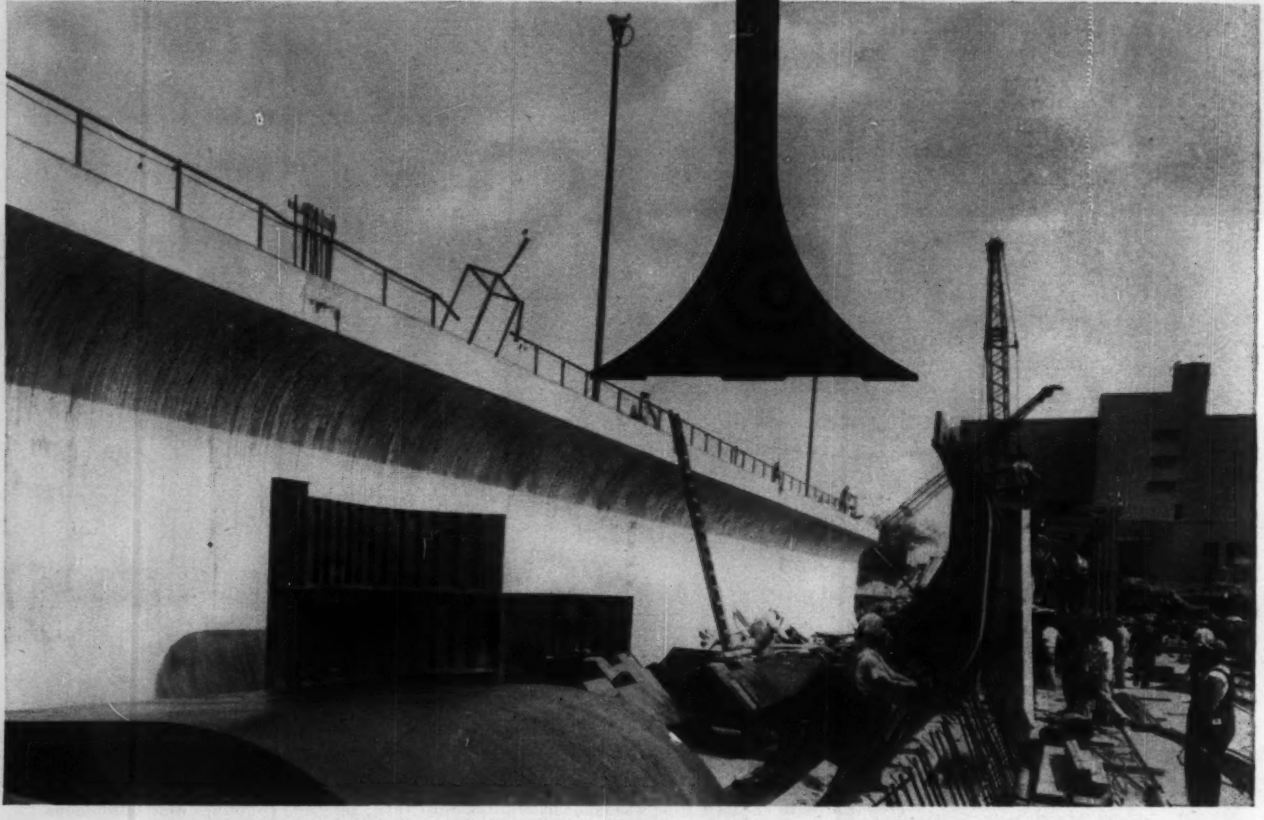
How to Pour a Y Shaped Wall Without Trouble



Contractor: J. Rich Steers, Inc., New York. Job: Bowery Bay Sewage Plant Expansion, New York City

Over 5,000 feet is a lot of wall. Particularly when it's 20′ high . . . and especially when it has a flared base and considerable overhang. Labor and material costs could run very high on a job like this.

But when J. Rich Steers, Inc., took the contract for the two new aeration tanks at the Bowery Bay Sewage Treatment Plant, they knew how it should be handled. They called on Irvington engineers to build a set of forms that would keep costs down.

The forms, made in 3′ sections for easy shipment, are quickly assembled into mulitple sections on the job. These multiple sections go together without complications to permit pours averaging about 70′ each. A simple but ingenious tie system makes bracing unnecessary. Trouble-free, accurate forming is dependably certain. **Finishing costs: negligible.**

If you are figuring on any job where repeated-use forms are indicated, it will cost you nothing, and may pay you greatly, to talk over ways and means with Irvington engineers. A letter, wire or phone call will put their experience and know-how at your service.

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(Continued from page 326)

M. R. Vaughn, Limona St., Tampa, Fla., LB **$150,298**, pumping stations and ejector stations, Div. XG17, XG21, XG23, XG26, TAMPA, FLA. Bd. Representatives, City Hall, Tampa, Fla. Bids Sept. 15. CD 8/22;
received no bids on Sept. 15, Div. XG28, Neptune Bay ejector station with one 250 g.p.m. capacity pneumatic sewage ejector (Tampa, Fla.).

† **Moss Constr. Co.**, 822 12 St., Columbus, Ga., LB **$933,547**, non-overflow earth dike at Fort Gaines Lock and Dam, Chattahoochee River, CIVENG-01-976-56-1, ALABAMA and GEORGIA. U. S. Eng., Grant St., Mobile, Ala. Bids Sept. 13. CD 8/17.

Clarke Stewart & Wood, 328 Georgetown St., Lexington, Ky. LB **$213,000**. swimming pool, FRANKFORT, Ky. City, 307 W. Main St., Frankfort, Ky. Bids Sept. 12. CD 8/24.

† **T. E. Akers & Co.**, 1213 Division St., Nashville, Tenn., CA **$553,887**, air force facility buildings and utilities, IFB ENG-40-058-56-1, JOELTON, TENN. U. S. Eng., 306 Federal Office Bldg., Nashville, Tenn. Bids About Aug. 16. CD 7/21.

† **Empire Gas Engr. Co.**, 7 Baltimore Pl. N. W. Atlanta, Ga., CA **$233,833**, conversion of heating facilities to natural gas, Contr. No. AF 40(602)-359, IFB 40-602-55-51, Stewart Air Force Base, SMYRNA, TENN. Purchasing & Contracting Office, Sewart Air Force Base, Smyrna, Tenn.

BUILDINGS—LB & CA

▲ **Murphy Pound Constr. Co.**, 1208 Midway Dr., Columbus , Ga., CA, **$3,000,000**. SHOPPING CENTER, COLUMBUS, GA. B. Thorpe & Co., 951 Pennsylvania Ave., Pittsburgh, Pa. Awarded Sept. 9.

Louis Briggs Constr. Co., Box 570, Macon, Ga., LB, **$965,259**. Jeffersonville Vocational SCHOOL; Jeffersonville ELEMENTARY & HIGH SCHOOL; Mount Olive Elementary SCHOOL; Smith Elementary SCHOOL; Antioch Elementary SCHOOL, JEFFERSONVILLE, GA. State School Bldg. Auth., 41 Exchange Pl. S.E., Atlanta, Ga. Bids Sept. 13. CD 8/16.

† **Malan Constr. Co.**, 25-09 42 St. Rd., Long Island City 1, N. Y. CA **$978,000**. process constr. BLDG. C-420, Inv. 58, PADUCAH, KY. Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash., D. C. Bids Aug. 5, awarded Aug 18. CD 8/12, under LB.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

Ill., Menard—HEATING SYSTEM—BA 10/4—State Div. Architecture & Eng., Armory-Office Bldg., Springfield, heating work, pipe covering work, repairs to heating sys., Hospital Bldg., Illinois State Penitentiary, Menard Branch. CD 2/27/45, under Public Buildings.

Ill., St. Charles—BA 10/4—State Div. Architecture & Eng., Armory-Office Bldg., Springfield, water main exten. for fire protection; turbine well pump, pump house and piping, electrical work for pump, pumphouse and services for Well No. 3, Illinois State Training School for Boys.

O., Akron—BA 10/4—City, Dpt. P. Service, Leo G. Walter, supt., Municipal Bldg., sanitary sewer in Chandler Ave. from Mud Run to 24 St. S.W.; 24 St. from Chandler to Battles Ave.; Battles Ave. from 24 to 13 St. $128,618. Beiswenger & Hoch, 661 W. Market St., engrs. CD 11/6/53.

† **O., Dayton** — CELL MODIFICATIONS — BA 10/4 — U. S. Eng., P.O. Box 59, Louisville 1, Ky., modifications in Cells A, B and C Bldg. 71-A, Wright-Patterson Air Force Base. $500,000. CD 6/22, under LB.

† **Wis., Milwaukee** — WAREHOUSE — BA 10/5 — U. S. Eng., 475 Merchandise Mart, Chicago 54, Ill., warehouse, General Mitchell Field, Milwaukee, Serial No. ENG-11-032-56-5. Extended date. CD 9/2.

Ind., Mount Vernon—BA 10/10—City, Paul Hironimus, mayor, (A) sanitary sewer extens., incl. 51,650 lin. ft. 8- to 24-in. sewers; 220 manholes and appurtenant work (B) sewage treatment plant and sewage pumping station. Plans deposit $30. Paul J. Kleiser & Assocs., 671 Tippecanoe St., Terre Haute, engrs. CD 4/6.

† **Illinois**—BA 10/20—U. S. Eng., 420 Locust St., St. Louis 2, Mo., abatis dikes across existing levee borrow pits, East Cape Girardeau and Clear Creek Drainage Dist., Proj. Item IV-A (2) Alexanders Co., CIVENG-23-065-56-15.

BUILDINGS—BA

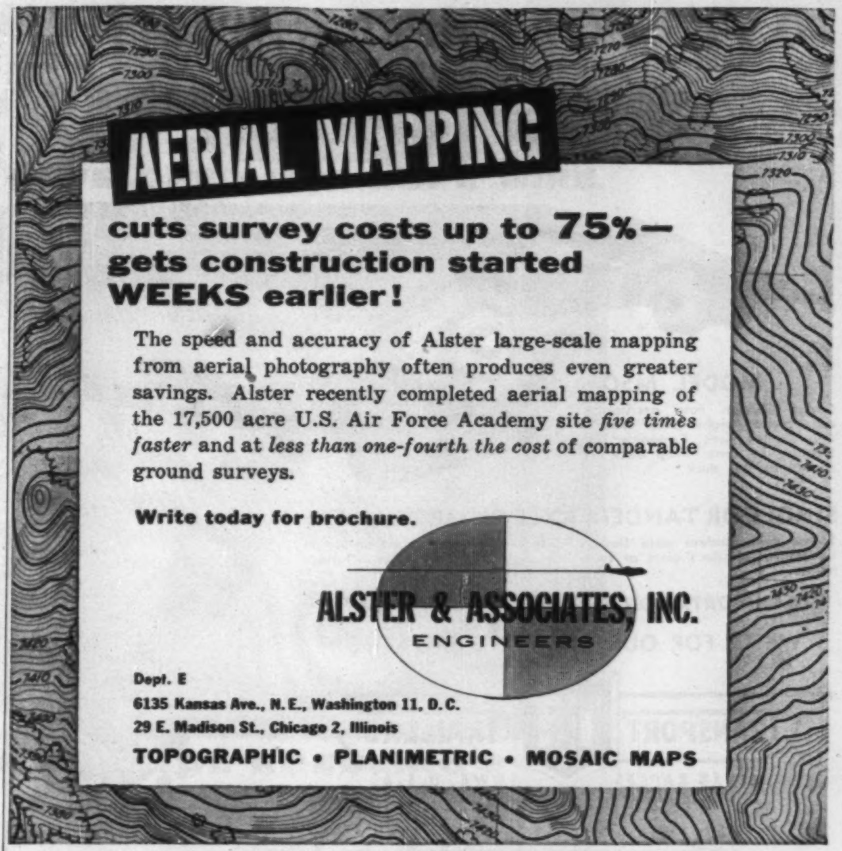
▲ **Ill., Joliet**—SCHOOL—BA 10/5—School District 86, 153 S. Ottawa St., West Side High School. $1,500,000. Childs & Smith, 20 N. Wacker Dr., Chicago, Zone 6, archts. CD 12/23.

Mich., Monroe—SCHOOL—BA 10/6—Bd. Educ., Jefferson Consolidated School Dist., constr. Jefferson Consolidated School addn. Jensen & Keough, 15875 James Couzens Hy., Detroit, archts. CD 1/2/53.

O., Crestline — HOSPITAL — BA 10/8 — Bd. Trustees Crestline Memorial Hospital, Crestline, 1 story, bsmnt. hospital. $350,000. Loren J. Staker, 484 Berkely St., Columbus, archt. CD 10/21.

Mich., Frankenmuth—SCHOOL—BA 10/11—Frankenmuth Twp. Bd. Educ., A. C. Nuechterlein, secy., constr. Frankenmuth Town School addn. Plans deposit $25, refundable. Frederick E. Wigen, 507 Wiechmann Bldg., Saginaw, archt.

O., Parma—SCHOOL—BA 10/14—Bd. Educ., Carl G. Byers, supt., 5401 W. 54 St., Zone 29, Pleasant Valley Junior High School addns. $450,000. Plans deposit $25 general, $20 heating, vent. and plumbing;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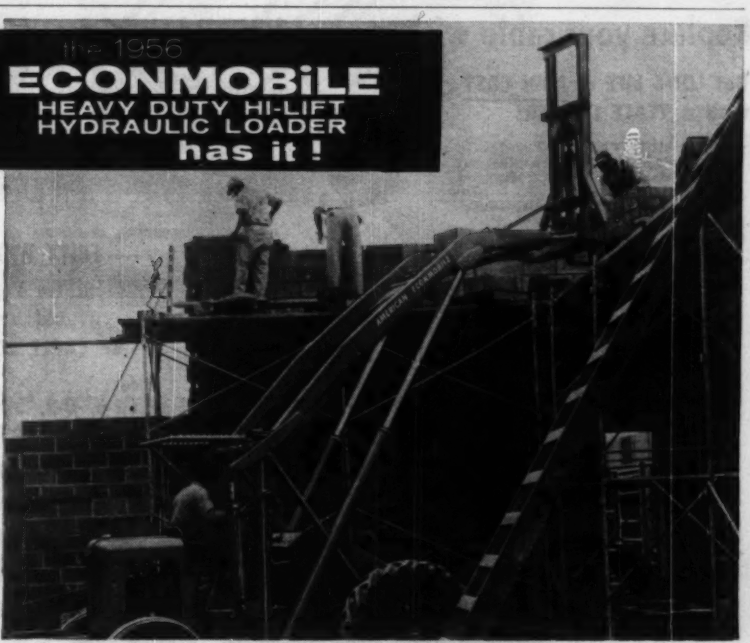

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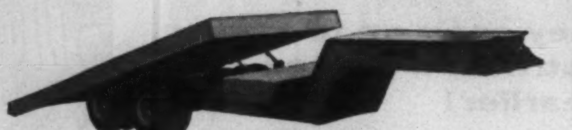

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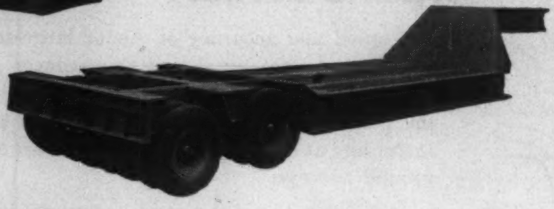

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$20 electrical, $15 furnishings and equip., $15 kitchen equip. Fulton, Krinsky & DelaMotte, 6014 Euclid Ave., Cleveland, Zone 3, archts. CD 8/4.

O., Toledo—SCHOOL—BA 10/14—Bd. Educ., Wm. E. Hallauer, asst. supt., Linwood and Southard Sts., DeVeaux School addn., Sylvania Ave. and Maxwell Rd. $433,103. Plans deposit $15. Britsch & Munger, National Bank Bldg., archts. CD 11/19.

O., Massillon—SCHOOL—BA 10/19—Bd. Educ., Massillon, Franklin School. $725,000. Dalton & Dalton, Old Arcade, Cleveland, Zone 14, archts. CD 9/16.

O., Wilmington—SCHOOL—BA 10/24—Bd. Educ., Simon Kenton Local School Dist., new high school, altering present high and elementary schools, $350,000. Plans deposit $25. Sullivan-Isaacs-Sullivan & Assoc., 1800 Reading Rd., Cincinnati, engrs.-archts. CD 11/10.

BUILDINGS—SLC

▲ **Ill., Chicago** — OFFICE — Salvation Army, 719 S. State St., Zone 10, soon lets contract office, 866 N. Dearborn Parkway. $1,250,000. Skidberg & Olsen, 2532 Milwaukee Ave., archts. CD 9/15.

HEAVY CONSTRUCTION—LB & CA

White Constr. Co., 1313 Circle Square, Forest Park, Ill., LB, **$128,181** (4 bidders) resurf. East and West Grand Ave., CHICAGO, ILL. City, City Hall, Chicago, Ill. CD 1/28.

Robert A. Black, Inc., 13912 S. Halsted St., Riverdale, Ill., LB, **$92,000.** bit. surf. Golfview Rd., NORTHLAKE, ILL. Village, Village Hall, Northlake, Ill. Consoer Townsend, 351 E. Ohio St., Chicago, Zone 11, engr. Awarded Sept. 8.

Werner Co., 9713 Harding Blvd., Wauwatosa, Wis., CA, **$75,003.** (12 bidders) sewers in S. Honey Creek Dr., MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids Sept. 12, awarded Sept. 13.

BUILDINGS—LB & CA

Mayer-Hecht Co., 2824 Stanton Ave., Cincinnati, O. LB **$113,800.** BOILER HOUSE, equip. MAINTENANCE SHOP, 2710 Reading Rd., CINCINNATI, O. Bethesda Hospital, Reading Rd., Cincinnati, O. CD 8/17.

▲ **Swango & Sons Constr. Co.**, 258 E. Stroop St., Dayton, O. Owner Builds. **$12,000,000.** 600 brick HOMES, east of Wilmington Pike and south of Swigert Rd. on 200 acre site known as "Rolandia Acres", KETTERING, O.

Clifford C. Loss, 3656 Alexis Rd., Toledo, O. Owner Builds. **$350,000.** 34 HOMES on Harvest Lane between Meteor and Buchanan in Washington Twp., TOLEDO, O.

Don Shine Realty Co., 5560 Madison Ave., Indianapolis, Ind. Owner Builds. **$400,000** or more. HOUSES, on south side, INDIANAPOLIS, IND.

Atlantic Constr. Corp., 4221 N. Ritter Ave., Indianapolis, Ind. Owner Builds. **$500,000.** HOUSING, on east side, INDIANAPOLIS, IND.

▲ **F. A. Wilhelm**, 3914 Prospect St., Indianapolis, Ind., CA, **$1,200,000**, general contract 3 story OFFICE BLDG., 2020 N. Meridian St., INDIANAPOLIS, IND. Citizens Gas & Coke Utility, Maryland and Pennsylvania Sts., Indianapolis, Ind. CD 1/19.

Circle Drive Estates, Mooresville, Ind. Owner Builds. **$400,000.** HOMES in Circle Drive Estates, MOORESVILLE, IND.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$8,375,000.** 375 HOMES, BARRINGTON, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$3,750,000.** 150 HOMES, near CHICAGO, ILL.

Fred Berglund & Son, 8410 S. South Chicago Ave., Chicago, Ill., CA, **$200,000.** 20,000 sq. ft. chemical PLANT, CHICAGO, ILL. Sherwin Williams Co., 115 and Cottage Grove Ave., Chicago, Ill. Schmidt, Garden & Erikson, 104 S. Michigan St., Chicago, Ill., archts. Awarded Sept. 12. CD 12/17.

Worsham Midwest Corp., 3557 W. Peterson St., Chicago, Ill., CA **$700,000** and **Wagner Iron Works**, 1905 S. 1 St., Milwaukee, Wis., CA **$250,000.** PLANT addns., WAREHOUSE, SILOS and OFFICE, KANKAKEE, ILL. A. O. Smith Corp., 3533 North 27 St., Milwaukee, Wis.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, MORTON GROVE, ILL.

▲ **Schavilje & Knoth**, 5668 N. Olcutt St., Chicago, Ill. Own Forces. **$3,600,000.** 130 HOMES, area of MOUNT PROSPECT, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$5,375,000.** 215 HOMES, NILES, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, NORTHBROOK, ILL.

▲ **Citation Builders**, 7728 N. Sheridan St., Chicago, Ill. Own Forces. **$1,250,000.** 50 HOMES, NORTHFIELD, ILL.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

† **Arkansas**—BA 10/5—U. S. Eng., P. O. Box 97, Memphis 1, Tenn., levee construction, incl. riverside enlargement and roadway embankment Levee Item No. WR-L-58, above Lambrook, Levee Stations 14/50-18/40, in White River Drainage District of Phillips and Desha Counties, CIVENG-40-041-56-36.

† **Wyoming**—BA 10/11—Bureau Reclamation, Reclamation Center, Casper, compacted earth lining for Casper Canal, Station 1164 plus 00 to Station 1194 plus 00,

(Continued on page 333)

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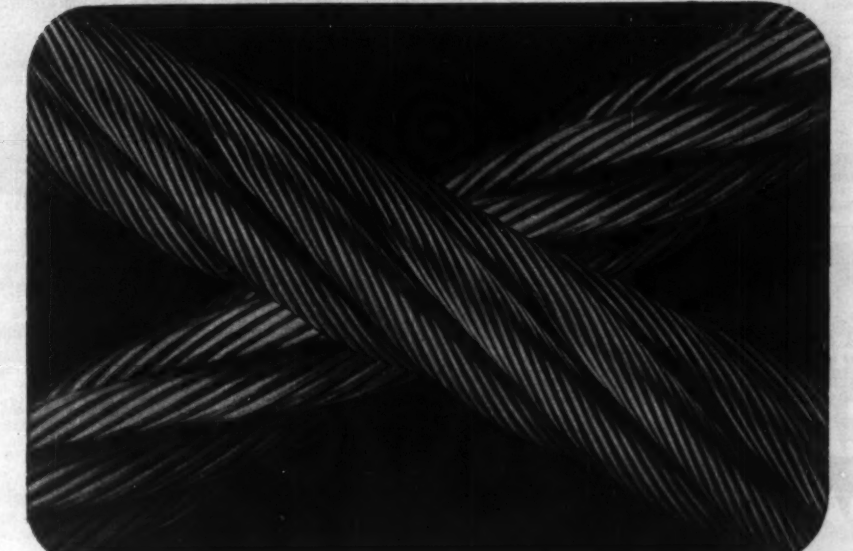

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(Continued from page 330)

Station 2038 plus 00 to Station 2043 plus 00 and Station 2073 plus 50 to Station 2087 plus 00 Kendrick Proj., Spec. 703C-384; adv. ENR 9/29. CD 9/12/44.

† **Arkansas**—BS 10/13—U. S. Eng., P. O. Box 60, Vicksburg, Miss., approx. 637,000 cu. yd. earthwork on north bank of Arkansas River in Jefferson Co.

† **Tex., Fort Worth**—AIRCOMNET BLDG.—BA 10/18—U. S. Eng., 100 W. Vickery Bldg., aircomnet bldg., Carswell Air Force Base, ENG-41-443-56-2. Tatum & Quade, 2812 Fairmount St., Dallas, archts. CD 6/18/52.

† **Wyoming**—BA 11/1—Bureau Reclamation, Dpt. Interior, Rock Springs, earthwork, structures, for Eden laterals, sublaterals, drains and wasteways, Eden Proj., near Eden, Spec. DC-4479; adv. ENR 9/29.

BUILDINGS—BA

Neb., Omaha—POWER PLANT PIPING—BA 10/27—Omaha Public Power Dist., 17 and Harney Sts., piping sys., etc. for Unit 2, North Omaha Power Plant. $100,000. Pioneer Service & Eng. Co., 231 S. LaSalle St., Chicago, Ill., engr. A. G. Johnson, c/o owner, ch. engr. CD 8/17/51.

Martin Eng. Co., Pelican Rapids, Minn., LB **$489,414.** (4 bidders) 749 mi. rural telephone lines in Stevens, Swift, Big Stone, Pope and Traverse Counties, MINNESOTA. Federated Telephone Co-operative, Chokio, Minn. Bids Sept. 13. CD 8/22.

City, H. Erickson, city engr., City Hall, Minneapolis, Minn. Owner Builds. **$75,000.** furnish, install new type fluorescent lighting in Hennepin Ave. between Washington Ave. and 12 St., MINNEAPOLIS, MINN.

Underground Constructors, Dodge Center, Minn. CA **$300,000.** lay 15 mi. 6 in. pipe line from Pine Bend, to owner's terminal in west St. Paul, ST. PAUL, MINN. Socony Mobil Oil Co., 852 Hathaway St., St. Paul, Minn.

† **Bushman Constr. Co.**, Box 107, St. Joseph, Mo. LB **$959,182**, est. $859,664. earthwork and structures Kirwin Main Canal, Spec. DC-4488, KANSAS. Bureau Reclamation, Dpt. Interior, Kirwin, Kan. Bids Sept. 15. CD 7/27.

KANSAS—State Hy. Comn., Masonic Temple, Topeka,

Ira Van Buskirk & Sons, Hawarden, Iowa. CA **$234,845.** grading 8.733 mi., Proj. 75-7 F 063-4 (5), Brown Co. Bids Sept. 8. CD 8/25.

OKLAHOMA—State Hy. Dpt., Oklahoma City, Zone 5,

Park Ward Co., Commerce Exchange Bldg., Oklahoma City, Okla., CA **$539,002**, est. $543,213, grade 7.926 mi. and b. conc. paving Hy. 76, Garvin Co. Bids 9/13, awarded 9/15. CD 9/19, under LB.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,

rejected bids Sept. 13, reflooring Arkansas River Bridge near Haskell, Muskogee Co. LB **$77,059.** CD 9/19, under LB.

OKLAHOMA—State Hy. Dpt., Capitol, Oaklahoma City, Zone 5,

Okla.—**Lyles & Buckner**, Box 23, Muskogee, Okla., LB **$151,156**, est. $156,555, (7 bidders) concrete, steel bridge over Illinois River on county road, Chewey, Adair Co. Bids Sept. 13. CD 9/1.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,

Okla.—**Broce Constr. Co.**, Woodward, Okla., LB **$126,295**, est. $126,766, (5 bidders), soil cement base, double bit. surf. 4.662 mi. county road at Henryetta, Okmulgee Co.; LB **$78,972**, est. $78,547, (4 bidders) soil cement base, double bit. surf. 4.044 mi. country-road at Morris, Okmulgee Co.;

Okla.—**Clark Constr. Co.**, Woodward, Okla., LB **$81,873.** est. $89,011 (5 bidders) stabil. asph. base, double bit. surf. 5.578 mi. county road at Arnett, Ellis Co.;

Okla.—**Poston Constr. Co.**, Lawton, Okla., LB **$72,700.** est. $77,272 (6 bidders), stabil. asph. base, double bit surf. tr. county road 6.04 mi. at Altus, Jackson Co. Bids Sept. 13. CD 9/1.

▲ **TEXAS**—State Hy. Comn., Austin,

Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex. LB **$84,389**, 0.726 mi. structures, Hy. SH 259 and FM 13, Proj. S 1512 (2), etc., Rusk Co.;

Tex.—**Heldenfels Bros.**, P. O. Box 1917, Corpus Christi, Tex. LB **$165,514**, 0.5 mi. widen seven large drainage structures and approaches, Hy. US 281, Proj. F 798 (2), Live Oaks Co.;

Tex.—**Kidwell & Rogers Constr. Co. and McElwrath Bros.**, 4515 Prentico St., Dallas, Tex., LB **$170,889**, widen bridges and approaches 2.989 mi. Hy. US 87, Proj. F 631 (10), Gillespie Co.;

Tex.—**Whittle Constr. Co.**, P. O. Box 5602, Dallas, Tex. LB **$1,269,268**, Pecos River bridge and approach 1.373 mi. Hy. US 90, Proj. ER-14 (1), Val Verde Co. Bids Sept. 14. CD 8/4, 8/19, 8/29, 9/2.

▲ **TEXAS**—State Hy. Comn., Austin,

Tex.—**W. L. Barnes, Contr.**, 3102 Perry Lane, Austin, Tex. LB **$270,221**, fdn. course, flexible base, one course surf. tr., b. conc. 8.245 mi. Hy. US 181, Proj. F 266 (4), Karnes Co.;

Tex.—**B. G. Brown & Co., J. A. Pruit and T. M. Brown & Sons, Inc.**, P.O. Box 1919, Abilene, Tex., LB **$913,547**, flexible base, b. conc. pavement and T. & P. R.R. overpass 9.397 mi. Hy. US 80, Proj. FI 7 (5), etc., Mitchell Co.;

Tex.—**E. B. Darby & Co., Inc.**, P.O. Box 467, Pharr, Tex. LB **$152,788**, grading, structures, base, surf. 12.787 mi. Hy. LM 606, etc., Proj. S 604 (3), etc., Willacy Co.;

Tex.—**J. R. Fanning**, P.O. Box 1278, Lubbock, Tex., LB **$775,483**, flexible base, b. conc. 10.051 mi. Hy. US 66, Proj. C 275-5, etc., Gray and Donley Counties;

Tex.—**Gulf Bitulithic Co.**, P.O. Box 2572, Houston, Tex. LB **$119,632**, grading, structures, base, surf. 6.107 mi. Hy. FM 1693, Proj. S 2072 (1), Colorado Co.;

Tex.—**E. W. Hable & Sons**, Corsicana, Tex., LB **$88,577**, grading, structures, base, surf. 3.317 mi. Hy. FM 246, Proj. S 374 (8), Navarro Co.;

Tex., **Harrison Eng. & Constr. Corp.**, 3706 Broadway, Kansas City, Mo., LB **$283,545**, grading, structures, pavement wid'n. 1.519 mi. Hy. US 69, Proj. F 53 (18), Jefferson Co.;

Tex.—**Allen Keller Co.**, P.O. Box 393, Fredericksburg, Tex., LB **$83,599**, flexible base, two course surf. tr. 0.874 mi. Hy. US 281, Proj. F 723 (1), Burnet Co.;

Tex.—**L. H. Lacy Co.**, 563 Yale Blvd., Dallas, Tex., LB **$884,631**, c. conc. 3.738 mi. Hy. US 75, Proj. F 539 (15), etc., Grayson Co.;

Tex.—**John T. Leslie**, Bailey, Tex., LB **$230,817**, flexible base, two course surf. tr. 3.545 mi. Hy. SH 158, Proj. S 691 (3), Sterling Co.;

Tex.—**Luce Constr. Co. & C. C. Booth**, P.O. Box 1799, Vernon, Tex., LB **$556,065**, flexible base, two course surf. tr. 14.843 mi. Hy. US 67 and 377, Proj. F 580 (11), etc., Comanche Co.;

Tex.—**Ernest L. Mays**, 3430 Minglewood Dr., Beaumont, Tex. LB **$116,159**, grading, structures, base, surf. 6.218 mi. Hy. FM 562 and 1985, Proj. R 1022-1-7, etc., Chambers Co.;

Tex.—**Hugh McMillan**, P.O. Box 1227, El Paso, Tex., LB **$108,027**, grading, structures, base, surf. 9.164 mi. Hy. FM 1437, Proj. S 2059 (1), etc., Hudspeth Co.;

Tex.—**Moore Bros. Constr. Co.**, Lufkin, Tex., LB **$86,076**, grading, structures, base, surf. 5.45 mi. Hy. FM 2259, Proj. S 2016 (1), Nacogdoches Co.;

Tex.—**Dan Pennington**, Grapeland, Tex., LB **$153,418**, grading, structures, base, surf. 8.852 mi. Hy. FM 542, Proj. V 426-3-3, Leon Co.;

Tex.—**Reynolds & Huff**, P.O. Box 88, Tyler, Tex., LB **$114,767**, grading, structures, base, surf. 6.191 mi. Hy. FM 2254, Proj. S 2067 (1), Camp Co. Bids Sept. 13. CD 9/2, 8/19, 8/29.

TEXAS—State Hy. Comn., Austin,

Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex. LB **$110,219**, bridge and approach 0.792 mi. Hy. FM 521, Proj. C 846-3-2, Matagorda Co.;

Tex.—**Norman L. Larson & Dean Skinner, Contr.**, P. O. Box 5216, Austin, Tex., LB **$285,782**, widen bridges and approaches 2.477 mi. Hy. US 77 and 77A, Proj. F 373 (5), etc., Lavaca Co. Bids Sept. 13. CD 8/29, 9/2.

▲ **TEXAS**—State Hy. Comn., Austin,

Tex.—**W. R. Aldrich & Co.**, P. O. Box 1751, Baton Rouge, La., LB, **$1,233,821**, grading, structures 6.946 mi. Hy. SH 73, Proj. IN 1052 (28) Chambers Co.;

Tex.—**R. C. Buckner**, P. O. Box 609, Jacksonville, Tex., LB **$112,690**, grading, structures, base, surf. 5.065 mi. Hy. FM 144, Proj. S 576 (3), Morris Co.;

Tex.—**Collins Constr. Co. of Texas**, P. O. Box 1192, Austin, Tex., LB **$189,657**, flexible base, b. conc. 2.574 mi. Hy. SH 349 and 158, Proj. C 380-9-12,

(Continued on page 334)

FACTS
YOU SHOULD KNOW ABOUT
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FOAM CONCRETE

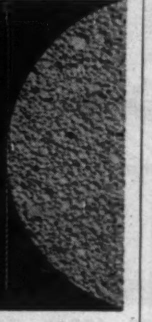
1 **WHAT IS MEARLCRETE FOAM CONCRETE?** It is cellular concrete made up of individual air cells. The tough, preformed foam, made with Mearlcrete Foam Liquid, is blended into the ordinary cement slurry, with or without aggregates, to make a foam concrete in any desired density, from 20 to 120 pounds per cubic foot.

2 **DENSITY IS CONTROLLED WITH PRECISION.** Normal variations in temperature, water hardness, and other factors which affect chemical air entraining agents, do not affect Mearlcrete Foam. For this reason, the density of Mearlcrete Foam Concrete can be controlled with unusual exactness.

3 **IT IS EASY TO HANDLE.** Mearlcrete Foam Concrete can be poured in place or pre-cast, air cured or autoclaved. Because of its stability, it can be placed in large volumes from a central mixing station by pneumatic pressure, achieving great savings in time and labor.

4 **IT IS LOW IN COST.** Mearlcrete Foam Liquid is used in such small amounts, that its costs represent only a tiny fraction of the total. In addition, savings in aggregate costs are made possible, because Mearlcrete, using readily available air, can replace part or all of any lightweight aggregates.

5 **IT HAS MANY APPLICATIONS.** Mearlcrete Foam Concrete has already proven itself advantageous for many applications, including tank and pipe insulation, insulation for thin wall panels, floor fill, roof fill, and many autoclaved products. The Mearl staff is ready to assist you in developing any specific applications.



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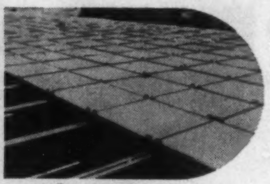
Tilt-up
sandwich panel.



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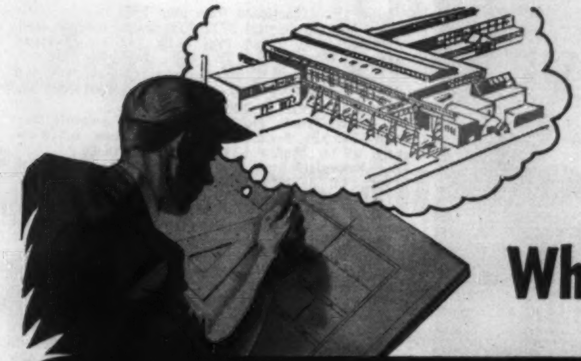
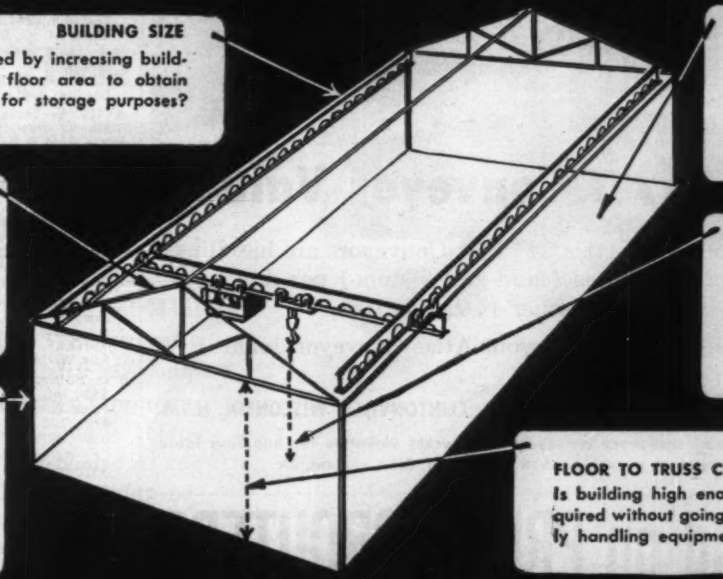


Don't Forget *Materials Handling* When Designing the Building

BUILDING SIZE
How much will be saved by increasing building height instead of floor area to obtain necessary cubic space for storage purposes? Usually it costs less.

ROOF TRUSS CAPACITY
Will roof trusses carry Tramrail, or other conveyors, in addition to other usual loads?

COLUMN SIZE
Are columns heavy enough to support overhead handling equipment and moving loads? Will they take possible future larger size loads?



FLOOR
Is floor designed to withstand wear and tear of heavy floor truck traffic without undue costly maintenance?

MAXIMUM LIFT
What will be maximum lift required? What load weight? What is weight and clearance dimensions of equipment to handle this load?

FLOOR TO TRUSS CLEARANCE
Is building high enough to secure lift required without going to special, more costly handling equipment?

The foremost demand of a new factory building, whether for production or storage, is that its design and construction aid overall operating efficiency to the utmost. Thus, the building becomes more than just an enclosure, but is actually a vital part of the manufacturing process.

It is, therefore, imperative that the various steps entering into the making of an item be thoroughly considered when the building is designed. One of the most important of these concerns materials handing because this item often amounts from 25% to 50% of the total production cost, and, also, because it is plant-wise in nature.

Regardless of what handling methods are deemed best, overhead cranes or Tramrail, roller or chain conveyors, floor trucks, etc., the building design, size and construction usually has a tremendous bearing on the ultimate handling efficiency secured. Building clearances, floor construction, column locations, aisleway allowances and other factors must be considered for the different handling methods for most satisfactory results.

For initial economy in installation, for most satisfactory operation and highest efficiency, plan for materials handling when you design the building. ***Do not make materials handling an afterthought.***

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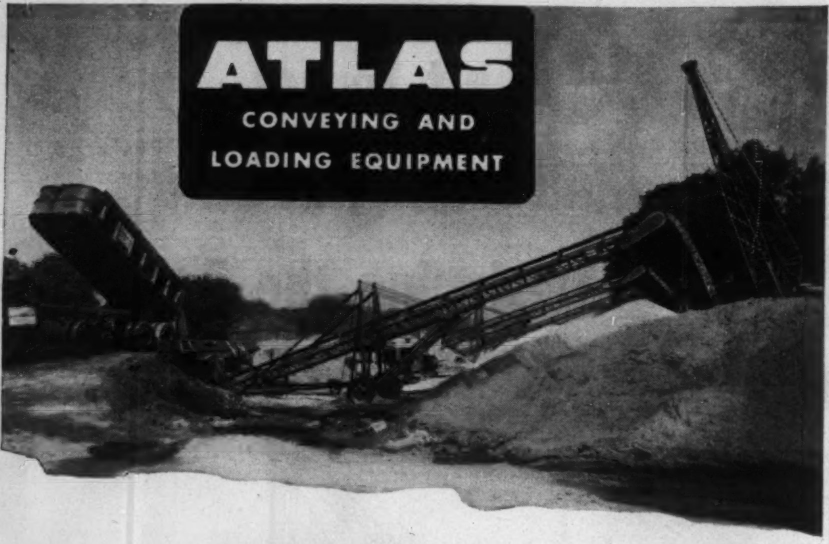

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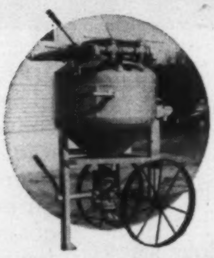

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(Continued from page 332)

etc., Midland Co.; LB **$711,403**, flexible base, b. conc. 7.897 mi. Hy. US 80, Proj. F 19 (14), etc., Eastland Co.;

Tex.—**Ivan Dement**, P. O. Box 1787, Amarillo, Tex., LB **$810,112**, flexible base, hot mix b. conc. 17.947 mi. Hy. US 83, Proj. F 581 (11) Jones Co.;

Tex.—**Gilvin-Terrill, Inc.**, P.O. Box 2268, Amarillo, Tex. LB **$245,321**, flexible base, hot mix b. conc. 6.512 mi. Hy. US 60, Proj. F 639 (8), Deaf Smith Co.;

Tex.—**Heldenfels Bros.**, P.O. Box 1917, Corpus Christi, Tex., LB **$126,818**, grading, structures, base, surf. 7.713 mi. Hy. FM 1833, Proj. R 2077-2-1, Nueces Co.;

John G. Holland, P. O. Box 14097, Houston, Tex., LB **$688,130**, Deepwater-Port storm sewerage sys. Hy. ST 73, Proj. UI 1052 (27), Harris Co.;

Tex.—**Ernest Loyd**, P. O. Box 1120, Fort Worth, Tex., LB **$254,626**, grading, structures, base, surf. 11.579 mi. Hy. FM 931 and 1829, Proj. S 1415 (2), etc., Coryell Co.;

Tex.—**J. W. Perry**, 501 Insuance Bldg., San Antonio, Tex. LB **$184,867**, grading, structures, base, surf. 4.947 mi. Hy. FM 585 and FM 1850, Proj. S 426 (2), etc., Brown Co.;

Tex.—**R. B. Smith, Inc.**, 3702 Glen Haven St., Houston, Tex., LB **$247,199**, flexible base, two course surf. tr. 4.776 mi. Hy. SH 62, Proj. S 500 (2), Jasper Co.;

Tex.—**South Texas Constr. Co.**, P. O. Box 3536, Corpus Christi, Tex., LB **$177,785**, flexible base, b. conc. 2.145 mi. Hy. FM 1576, Proj. C 1504-1-5, Cameron Co. Bids Sept. 14. CD 8/19, 8/29, 9/2, 9/6.

▲ **TEXAS**—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,

Austin Road & Bridge Co., 1000 Singleton Blvd., Dallas, Tex., LB **$1,856,822**. Trinity River Bridge, Beckley Ave. grade separation and approach grading, Proj. D-FW24, Dallas Co. Bids Sept. 13. CD 8/24.

Houston County Electric Co-operative, Crockett, Tex. Own Forces. **$75,000**, some new lines and sys. imprvs., Houston Co., TEXAS. CD 4/13.

Navarro County Electric Co-operative, Corsicana, Tex. Own Forces. **$90,000**, some new rural line extens., Corsicana, Navarro Co., TEXAS. CD 4/13.

† **Leslie Miller, Inc.**, 5324 E. Lancaster St., Fort Worth, Tex., LB **$167,026**, est. $160,931 aircraft refueling sys. extens. Abilene Air Force Base ENG-41-443-56-14, ABILENE, TEX. U. S. Eng., 100 W. Vickerey Blvd., Fort Worth, Tex. Bids Sept. 14. CD 8/25.

† **L. H. Lacy Co.**, 5630 Yale Blvd., Dallas, Tex., LB **$539,740**, est. $554,345, apron paving, Bergstrom Air Force Base, ENG-41-443-56-16, AUSTIN, TEX. U. S. Eng., 100 W. Vickery Blvd., Fort Worth, Tex. CD 9/8, under LB.

E. E. Farrow Co., 2128 Hawes St., Dallas, Tex., LB **$310,086** base; LB **$354,115**, Alt., est. $400,000. 24 and 27 in. water supply lines, DENTON, TEX. City, City Hall, Denton, Tex. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. Bids Sept. 12.

City, City Hall, Garland, Tex. Own Forces. **$75,000**, storm sewers rehabilitation; **$85,000**, unit of sanitary sewer transmission line, GARLAND, TEX. CD 8/18.

Lee & McKnight, Contractors, 7220 Canal St., Houston, Tex., LB **$89,268**, est. $118,800. Lockwood sewers, HOUSTON, TEX. City, City Hall, Houston, Tex. Frank Baldwin, dir. P. Wks. Bids Sept. 10.

Norton E. White, M. Esperson Bldg., Houston, Tex., LB **$251,399**, bridge over White Oak Bayou and an underpass at MKT. Ry., HOUSTON, TEX. City, City Hall, Houston, Tex. CD 9/8.

City, Tyler, Tex. Own Forces. **$65,000**, c. l. water lateral lines, TYLER, TEX. CD 8/25.

MONTANA—State Hy. Comn., Helena,

rejected bids July 27, bridge over Missouri River on Montana Hy. 19 between Malta and Grassrange, Fergus Co. CA **$599,788**, (Correction-status). CD 8/3, under CA.

COLORADO—State Hy. Dpt., 518 State Office Bldg., Denver,

Schmidt Constr. Co., Box 66, Grand Junction, Colo., CA, **$719,055**, est. $716,000, grading, structure plant mix asph. surf. 6.006 mi. Lafayette and Broomfield. IN-002-1 (11) Adams Co. Bids Sept. 9, awarded Sept. 12. CD 8/31.

BUILDINGS—LB & CA

▲ **McGough Bros.**, 1954 University Ave., St. Paul, Minn. CA Total est. **$15,000,000**. general contract superstructure 100,000 kw. steam GENERATING PLANT addn,. at owner's High Bridge site, ST. PAUL, MINN. Northern States Power Co., 15 S. Fifth St., Minneapolis, Minn. CD 2/1/54.

Enterprise Engine & Machinery Co., 18 and Florida Sts., San Francisco, Calif., LB, **$120,806** furnishing, installing diesel engine GENERATING UNIT, dual fuel in municipal power plant, LAKE MILLS, IOWA. City, Lake Mills, Iowa. Bids Sept. 12. CD 8/18.

B. L. McGee, 1320-F East 51st St., Austin, Tex. LB **$442,000**. WAREHOUSE and SHOP BLDG., CARPENTRY and PAINT SHOP, LABORATORY and RESIDENT ENGINEERS OFFICE at site of new District Office Bldg. on Interregional Hy. near Junction Hys. 290 and 81, AUSTIN, TEX. State Hy. Dpt., Austin, Tex. Wilson & Cottingham, Brown Bldg., Austin, Tex., structural engrs. A. T. Moses, 1011 W. 34 St., Austin, Tex., mechanical engr. Bids Sept 14. CD 8/31.

▲ **Robert E. McKee, General Contractor, Inc.**, 2708 Inwood Rd., Dallas, Tex., CA **$3,682,634**, general constr. incl. all utilities for 14 story Unit No. 1, RETAIL SHOPS, DALLAS, TEX. Exchange Park, c/o Wm. Blakley, 1307 Pacific St., Dallas, Tex. Lane, Gamble & Assocs., 2520 Mockingbird Lane, Dallas, Tex., archts. Powell & Powell, Thomas Bldg., and

(Continued on page 337)

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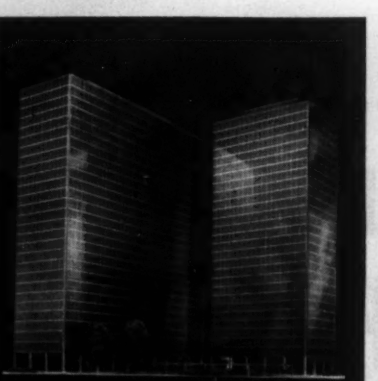

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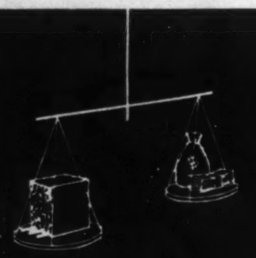
Chicago, Illinois

Ludwig Mies van der Rohe (Friedman, Alschuler & Sincere, Associated)
Architect

Frank J. Kornacker
Structural Engineer

Herbert S. Greenwald
General Contractor

Sumner Sollitt Company
Subcontractor



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(Continued from page 334)

Blum & Guerrero, 4930 Maple St., Dallas, Tex., engrs. Bids Sept. 2. CD 7/28.

Sears, Roebuck & Co., 916 N. Piedras St., cancelled bids to have been opened Sept. 9, MERCANTILE STORE EXPANSION, SERVICE STATION, EL PASO, TEX. Est. **$350,000.** CD 8/29.

Wedgemont Constr. Co., Box 11135, Fort Worth, Tex., CA **$416,616.** 48 addnl. DWELLINGS, FORT WORTH, TEX. G & H Land Co., Box 11131, Fort Worth, Tex. CD 8/18.

E. E. Cloir, Builder, 200 Burnett St., Fort Worth, Tex., CA **$354,450**, 27 DWELLINGS, FORT WORTH, TEX. E. E. Cloir, 200 Burnett St., Fort Worth, Tex. CD 8/18.

J. M. McClaine, 1005 Bayland St., Houston, Tex. Own Forces. **$358,700.** 32 DWELLINGS, HOUSTON, TEX. CD 8/18.

▲ **Tellepsen Constr. Co.**, 1710 Telephone Rd., Houston, Tex., CA, **$1,423,190.** clubhouse, foundation work, incl. grading, earthwork on grounds youth center with athletic course and playgrounds; rein.-con. swimming pool with related structures, HOUSTON TEX. Houston Country Club, 7000 Harrisburg Blvd., Houston, Tex. Bids Aug. 30. CD 8/5.

▲ **Bibb Brothers**, 100 Arvin St., San Antonio, Tex., CA **$1,250,000.** PETROLEUM CENTER; CA **$60,000** water sys.; CA **$60,000** earthwork, grading; CA **$90,000,** drainage, hard paving adjacent to Petroleum Center and hard paved auto parking center, SAN ANTONIO, TEX. Grand total $1,460,000. Petroleum Center, c/o Al Jergins & Assocs., Alamo Natl. Bldg., San Antonio, Tex. CD 9/14.

A. A. & E. B. Jones, 1050 S. Jason St., Denver, Colo., CA, **$312,839.** general contract 1 story, mezzanine, 158x400 ft., concrete block, structural steel, brick WAREHOUSE, SALESROOM and OFFICE, DENVER, COLO. Pittsburgh Plate Glass Co., 2619 Walnut St., Denver, Colo. Bids Aug. 8, awarded Aug. 10. CD 8/9.

▲ **Lembke-Clough & King, Inc.**, Box 455, Albuquerque, N. M., LB **$567,453.** Elementary SCHOOL; LB **$649,056.** masonry GYMNASIUM and PHYSICAL EDUCATION BLDG., LOVINGTON, N. M. Lovington Municipal Bd. Educ., Lovington, N. M. Schafer, Merrill & Assoc., 114 E. 14 St., Clovis, N. M., archts. Bids Sept. 8.

FAR WEST

HEAVY CONSTRUCTION—BA

▲† **California**—BA 10/11—U. S. Eng., 751 S. Figueroa St., Los Angeles, Los Angeles River Imprvt., Corbin Ave. to Reseda Blvd., River Mile 48.92 to 47.12, Los Angeles. $2,000,000. CD 12/17/52.

† **Idaho**—BA 10/20—U. S. Eng., City-County Airport, Walla Walla, Wash., operations bldg., Lucky Peak Dam, CIVENG- 45-164-56-14. CD 12/4/52.

HEAVY CONSTRUCTION—LB & CA

† **C. B. Lauch Constr. Co.**, 5404 Cedar St., Boise, Idaho, LB, **$163,503**, est. $201,485, face rehabilitation of Black Canyon Dam, Boise Proj., Spec. DC 4484, IDAHO. Bureau Reclamation, Dpt. Interior, Boise, Idaho. Bids Sept. 7. CD 8/1.

† **Olof Nelson Constr. Co.**, Logan, Utah, CA, **$148,905**, earthwork, structures for laterals, sublaterals and well stilling pools from Group 4 wells, Minidoka Proj., North Side Pumping Div., Spec. 100-230, IDAHO. Bureau Reclamation, Dpt. Interior, Rupert, Idaho. Bids Aug. 16, awarded Sept. 1. CD 8/4.

WASHINGTON—State Hy. Comn., Dpt. Hys., Olympia,
Northwest Constr. Co., 3950 6 Ave. N.W., Seattle, Wash., LB, **$87,148** (7 bidders) grading, surf., bit. penetration macad. 1.34 mi. Secondary State Hy. 17-A, concrete vicinity F.A.S. S0208 (4), Skagit Co. Bids Sept. 13. CD 8/26.

WASHINGTON—State Hy. Comn., Olympia,
C. A. Power, E. 3711 Olive St., Spokane, Wash., LB, **$94,765.** (6 bidders) rein.-con. rigid frame slab bridge for Sullivan undercrossing on Primary State Hy. 2, with draining, grading, surf., b. conc. paving approaches, F.A.P. IN-002-6 (17), Spokane Co. Bids Sept. 13. CD 8/26.

CALIFORNIA—State Div. Hys., Sacramento,
Calif.—**J. Henry Harris**, 2659 9 St., Berkeley, Calif., LB,**$86,962.** traffic signal sys., hy. lighting, channelization at intersection of Hy. 40 with Union Oil Co. crossroad at Oleum Contra Costa Co.;
Calif.—**Charles L. Harney**, 575 Berry St., San Francisco, Calif., LB **$85,644.** relocating intersection, channelization and installing traffic signal sys., U.S. 101 at Alemany Blvd. at Crescent Ave., San Francisco Co. Bids Sept. 14. CD 8/19.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles,
N. L. Basich, 1148 N. San Gabriel St., South San Gabriel, Calif., LB **$114,994**, est. $125,000 (2 bidders) plant mix surf. from Adams Ave. in El Centro to south city limits of Brawley, Imperial Co. Bids Sept. 15. CD 8/19.

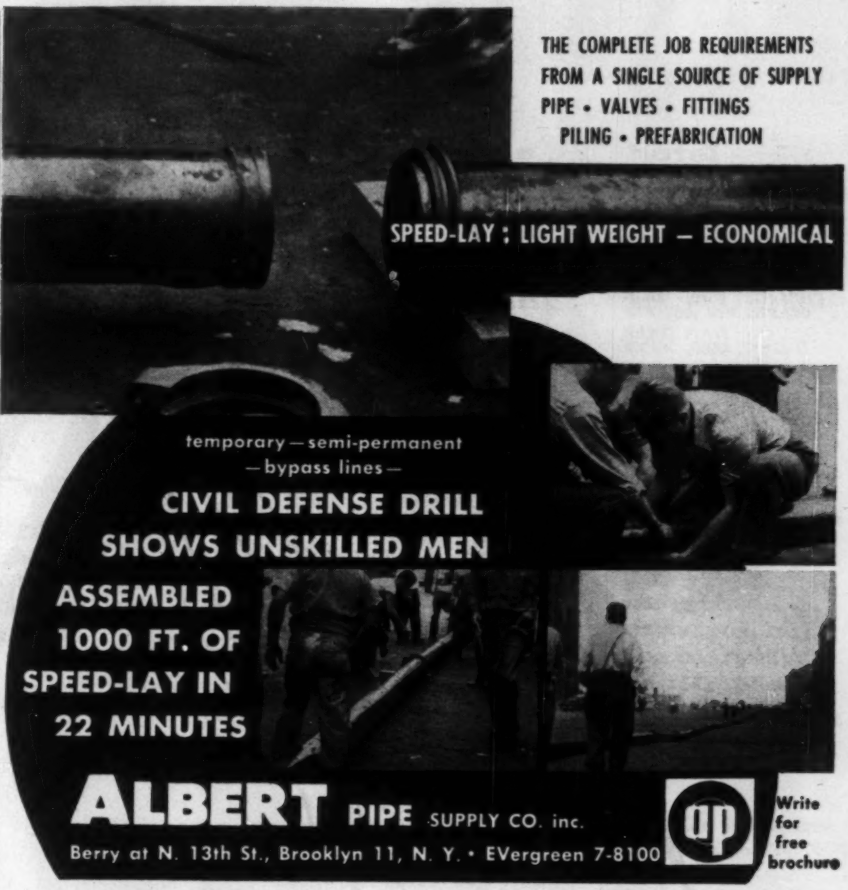
Ransome Co., 4030 Hollis St., Emeryville, Calif., LB, **$495,670** (7 bidders) Crockett Highway Unit No. 2, MARTINEZ, CALIF. Contra Costa Co., c/o clerk, Court House, Martinez, Calif. CD 6/10/52.

C. Norman Peterson Co., 2832 9 St., Berkeley, Calif., LB, **$474,832** (9 bidders) sewage treatment plant to serve Parkway Estates subdivision and other subdivision south of SACRAMENTO, CALIF. Sacramento Co., 7 and I Sts. Sacramento, Calif.

BUILDINGS—LB & CA

▲ **Pacific Co.**, 801 Cedar St., Berkeley, Calif., CA, **$2,222,000.** HIGH SCHOOL, 48-acre site, Pacific Ave. and Sargent Rd., LODI, CALIF. Lodi Union High

(Continued on page 340)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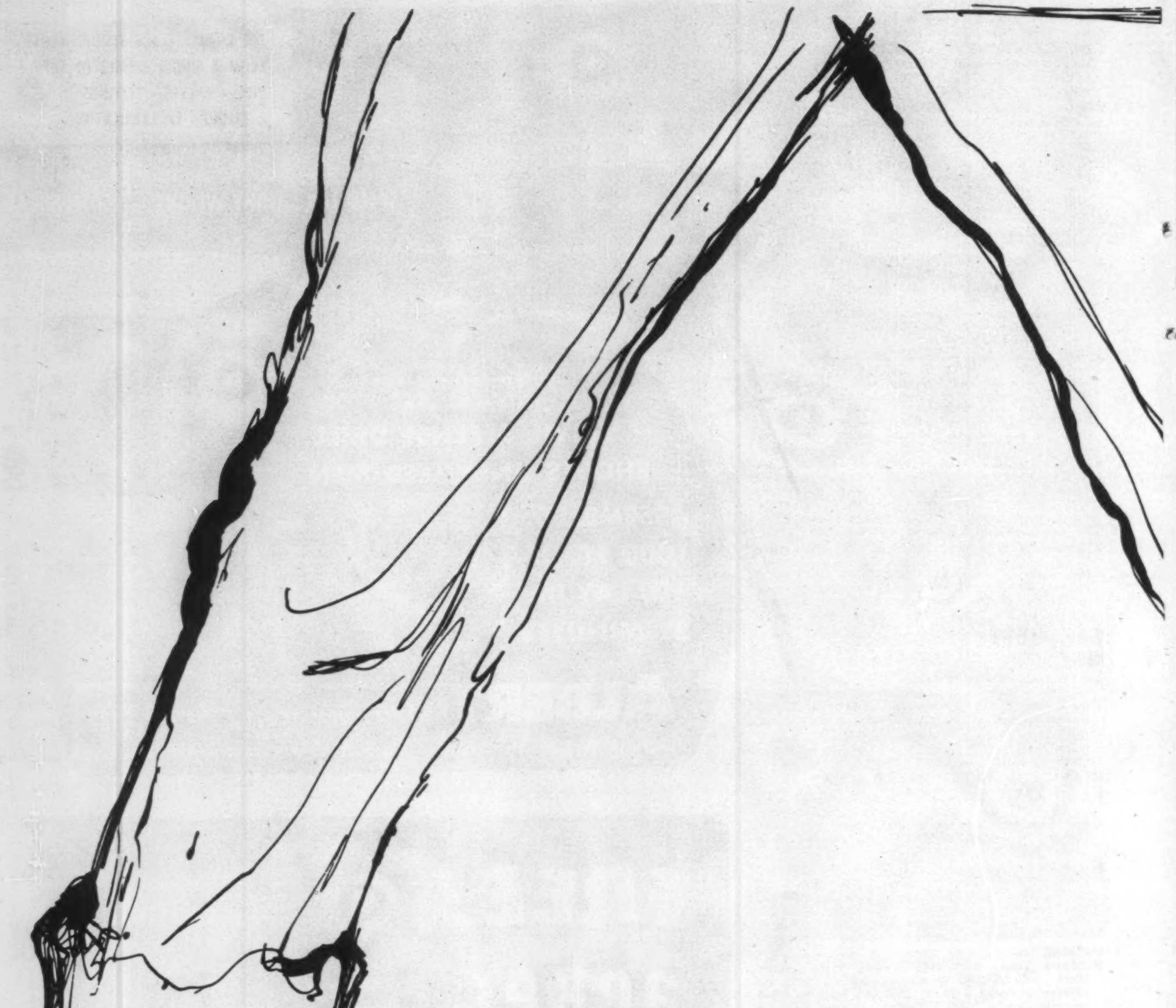
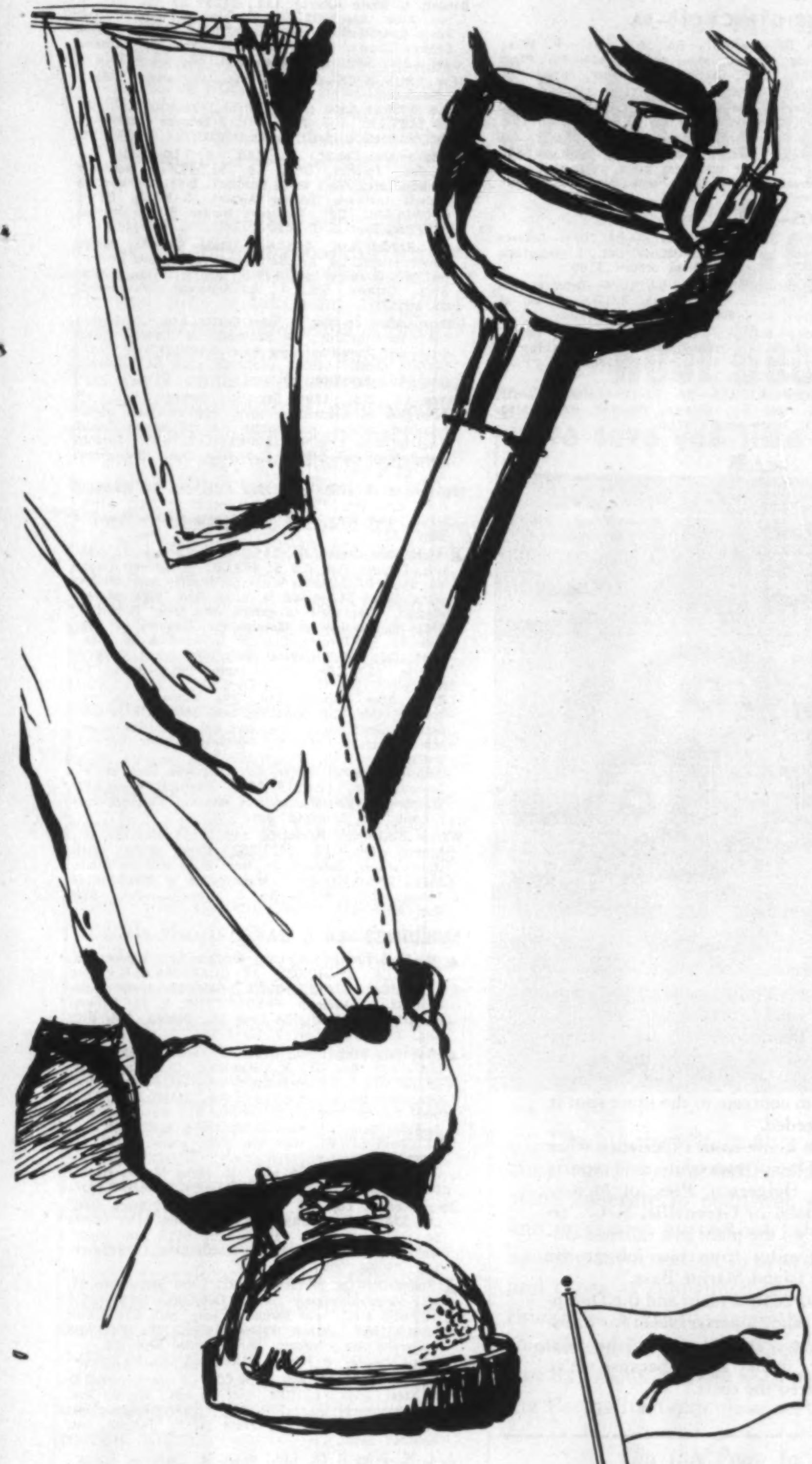


under construction..



air bases
GOOSE BAY, LABRADOR
CRETE, GREECE
ARGENTIA, NEWFOUNDLAND

breakwaters & dredging
GARY, INDIANA
PRESCOTT, ONTARIO
CHICAGO, ILLINOIS
CLEVELAND, OHIO

bridges
MACKINAC STRAITS
ST. IGNACE, MICHIGAN
HUDSON RIVER
TARRYTOWN, NEW YORK
CONNECTICUT RIVER
HARTFORD, CONNECTICUT
HUDSON RIVER
KINGSTON, NEW YORK
DELAWARE RIVER
EDGELY, PENNSYLVANIA
CUYAHOGA RIVER
CLEVELAND, OHIO
ILLINOIS RIVER
PEORIA, ILLINOIS
REYNOLDS CHANNEL
(TWIN BRIDGES)
LONG BEACH, NEW YORK
JAMAICA BAY
ROCKAWAYS, NEW YORK

dams
FOLSOM, CALIFORNIA
NEWHALEM, WASHINGTON
KITCHENER, ONTARIO

docks & piers
GROTON, CONNECTICUT
NEW LONDON, CONNECTICUT
PEORIA, ILLINOIS
CLEVELAND, OHIO
BOSTON, MASSACHUSETTS
CHICAGO, ILLINOIS
GARY, INDIANA

highways
MAINE TURNPIKE EXTENSION, SECTION
NEW JERSEY TURNPIKE, SECTION
BINGHAMTON, NEW YORK, EXPRESSWAY, SECTION
WINDSOR, CONNECTICUT, EXPRESSWAY, SECTION
NEW YORK STATE HIGHWAY AT SYRACUSE

hotel
CIUDAD TRUJILLO,
DOMINICAN REPUBLIC

industrial plants
NEWSPRINT & PULP MILLS
KAWERAU, NEW ZEALAND
NICKEL PLANT
NICARO, CUBA
WATER TREATMENT PLANT
FT. HOOD, TEXAS
POWERHOUSE SUBSTRUCTURE
ASHLAND CITY, TENNESSEE
CEMENT PLANT
HOWES CAVE, NEW YORK
FILTRATION PLANT
TORONTO, CANADA
AGGREGATE FOR POWERHOUSE
CORNWALL, ONTARIO

pipelines & marine oil terminal facilities
KURNELL, AUSTRALIA
BOMBAY, INDIA
ROTA, SPAIN
CLEVELAND, OHIO

radar bases
LABRADOR AND NEWFOUNDLAND

railroad relocation
CORNWALL, ONTARIO

vehicular tunnels
HAMPTON ROADS, VIRGINIA
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Ciudad Trujillo, Dominican Republic

(Continued from page 337)

School Dist., Lodi, Calif. Bids Sept. 8, awarded Sept. 14. CD 9/16, under LB.

Fabrizio & Martin, Inc., 55 Railroad Ave., South Norwalk, Conn., LB, **$484,990.** Springwood Elementary SCHOOL, NORWALK, CALIF. City Bd. Educ., c/o Supt. Schools, Norwalk, Conn. Bids Sept. 13.

▲ **Bayshore Constr. Co.**, 744 Folger Ave., Berkeley, Calif., CA, **$2,500,000.** rein.-con. APARTMENT, OAKLAND, CALIF. Co-Owners, Inc., c/o Donovan Peters, Mills Tower, San Francisco, Calif. Confer & Wills, 366 40 St., Oakland, Calif., archts. CD 10/7.

▲ **Stolte, Inc.**, 8451 San Leandro St., Oakland, Calif., CA, **$1,909,000**, E. M. Downer Junior HIGH SCHOOL, RICHMOND, CALIF. Richmond Union High School Dist., 1108 Bissel Ave., Richmond, Calif. Bids Sept. 12, awarded Sept. 14. CD 9/16, under LB.

Erickson Constr. Co., 1119 E. Bassett Law Ave., North Sacramento, Calif., CA, **$700,000.** 90,000 sq. ft. SHOPPING CENTER, incl. market, drug store and numerous shops, corner of Whitney and Watt Aves., SACRAMENTO, CALIF. Walker & Donant, 3232 Montclair St., Sacramento, Calif. Paul Hammarberg, 2941 Telegraph St., Berkeley, Calif., archt.

Cahill Brothers, 350 Sansome St., San Francisco, Calif., LB, **$945,000.** 113,950 sq. ft. FLOWER TERMINAL, SAN FRANCISCO, CALIF. San Francisco Flower Growers Assn. & California Flower Market, c/o Mario J. Campi, archt., 425 Bush St., San Francisco, Calif. Bids Sept. 6. CD 8/26.

CANADA

HEAVY CONSTRUCTION—BA

Ont., North Bay—WHARF—BA 10/5—Dpt. P. Wks., Hunter Bldg., Ottawa, wharf repairs, $84,000. Plans deposit $20. J. P. Carriere, c/o owner, engr.

N. S., Halifax—STEAM DISTRIBUTION SYSTEM—BA 10/6—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., steam distr. sys. $700,000. Plans deposit $100.

Sask., Moose Jaw—WATER TREATMENT PLANT—BA 10/6—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. water treatment plant, reservoir, water mains, Royal Canadian Air Force Base. $100,000. Plans deposit $100.

BUILDINGS—BA

N. S., Bedford Basin—MAGAZINES—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., 2 magazines, R.C.N.A.D. $150,000. Plans deposit $100.

Ont., Camp Borden—SCHOOL—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, R.C.D.C. School at Army Camp. $350,000. Plans deposit $100.

Ont., London—MESSES—BA 10/4—Defence Constr. Ltd., 56 Lyon St., Ottawa, 2 officers' messes for 50 and conversion of 4 boiler rooms. $800,000. Plans deposit $100. CD 3/18/53.

Ont., Lakeview—STORES—BA 10/12—Defence Constr. Ltd., 56 Lyon St., Ottawa, returned stores bldg. $350,000. Plans deposit $100.

HEAVY CONSTRUCTION—LB & CA

Bennett & White Alberta, Ltd., 11239 83 St., Edmonton, Alta., CA **$597,883.** hangar addn., Cold Lake Royal Canadian Air Force Base, COLD LAKE, ALTA. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Sept. 1, awarded Sept. 12. CD 8/23.

NEW BRUNSWICK—Dpt. P. Wks., Parliament Bldgs., Fredericton,

Forbes & Sloat, Ltd., 654 Union St., Fredericton, N. B., CA **$189,135**, grav. 7 mi. Rte. 2 between Fredericton and Oromocto Bridge. Awarded Sept. 12. CD 2/4/44.

▲ **McNamara Constr. Co. Ltd.**, 42 Industrial St., Leaside, Toronto, Ont., LB, **$1,549,478**, concrete parking area for new terminal bldg., connecting asphalt taxiways, Gander Airport, GANDER, NEWFOUNDLAND. Dpt. Transport Hunter Bldg., Ottawa, Ont. Bids Sept. 9. C 8/30.

H. V. Randell Ltd., 280 New Gower Rd., St. John's Newfoundland, LB, **$78,820.** wharf repairs and extens., HOLYROOD, NEWFOUNDLAND, Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. A. A. Anderson, c/o owner, ch. engr.

Dickson-Larkey Welding & Steel Constr. Ltd., 27 Layton Ave., Toronto, Ont., CA **$219,887** (9 bidders) steam distr. sys., Canadian Army Base, BARRIEFIELD, ONT. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Awarded Sept. 13.

Domex Co. Ltd., 1290 Bay St., Toronto, Ont., LB **$156,849** (6 bidders) 2 span, 150 ft. steel girder rein.-con. bridge, road width 30 ft., across Credit River on Base Line Rd., COOKSVILLE, ONT. Toronto Twp., Municipal Offices, Cooksville, Ont. Bids Sept. 12. CD 8/29.

McGinnis & O'Connor Ltd., 394 King St. E., Kingston, Ont., CA, **$86,175.** macadam roads in city, KINGSTON, ONT. City, City Hall, Kingston, Ont. Awarded Sept. 12.

▲ **McNamara Constr. Co. Ltd.**, 42 Industrial St., Leaside, Toronto, Ont., LB **$1,542,000** (3 bidders) Intake No. 2, at R. C. Harris water purification and pumping plant, Queen St.; 4,800 ft. 8 in. diam. pipe concrete encased, steel shell to extend into lake, TORONTO, Ont. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. H. G. Acres & Co., Ltd., 2135 Culp St., Niagara Falls, Ont., and Gore & Storrie, 1130 Bay St., Toronto, Ont., engrs., CD 9/3/54;
Brush Aboe (Canada) Ltd., 296 Richmond St. W., Toronto, Ont. LB **$661,536** and **$696,524** (6 bidders) 4 diesel engine generators and auxiliaries, supply and installation, John St. Pumping Station (Toronto, Ont.);
Ontario Electrical Constr. Co. Ltd., 494 King St. E., Toronto, Ont., LB **$137,000.** electrical equip. for Scarborough Filtration Plant exten., Kingston and Kennedy Rds. (Toronto, Ont.).

Warren Bituminous Paving Co. Ltd., 1454 Bloor St. W., Toronto, Ont., LB **$412,882**, street wid'n., incl. storm sewers, Bathurst St. from Briar Hill to Wilson Aves., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Aug. 22.

BUILDINGS—LB & CA

▲ **M. F. Schurman Co. Ltd.**, Eustane St., Summerside, P.E.I. CA, **$1,010,085**, 11 QUARTERMASTER and TECHNICAL STORES BLDG., Canadian Army Camp, Contract J, Gagetown, FREDERICTON, N. B. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Aug. 3, awarded Sept 9. CD 7/11.

▲ **Hamilton Bridge Div., Bridge & Tank Co., of Canada Ltd.**, 231 Bay St. N., Hamilton, Ont. Total Est. **$5,000,000.** CA superstructure for WIRE MILL, 5-acre site, Hamilton Bay at Parkdale Ave., HAMILTON, ONT. Steel Co. of Canada Ltd. Wilcox St., Hamilton, Ont. Awarded Sept. 12. Norman Wagner & Associates Ltd., 42 James St. W., Hamilton, Ont., engrs., CD 7/12, under CA;
Canadian Comstock Co. Ltd., 36 James St. S., Hamilton, Ont., CA, mechanical trades (Hamilton, Ont.).

Doran Constr. Co. Ltd., 5 Concord St., Ottawa, Ont., CA, **$345,000.** STORE addn., alterations, 156 Sparks St., OTTAWA, ONT. Zeller's Ltd., 5115 Tans Island, Montreal, Que. J. A. Ewart, Booth Bldg., 165 Sparks St., Ottawa, Ont., archt.

▲ **Foundation Co. of Canada Ltd.**, 1900 Sherbrooke St. W., Montreal, Que., CA, **$3,000,000.** SYNTHETIC LUMBER MILL near hardboard pulp mill, STURGEON FALLS, ONT. Abitibi Power & Paper Co. Ltd., 408 University Ave., Toronto, Ont. Awarded Sept. 12.

Wingold Constr. Co. Ltd., 2559 Eglinton Ave. W., Toronto, Ont., CA Est. **$350,000.** 1 story, 175x331 ft. steel, brick FACTORY, concrete fdn., Warden Ave. and Comstock Rd., TORONTO, ONT. International Parts (Canada), Ltd., 71 Front St. E., Toronto, Ont. Awarded Sept. 13.

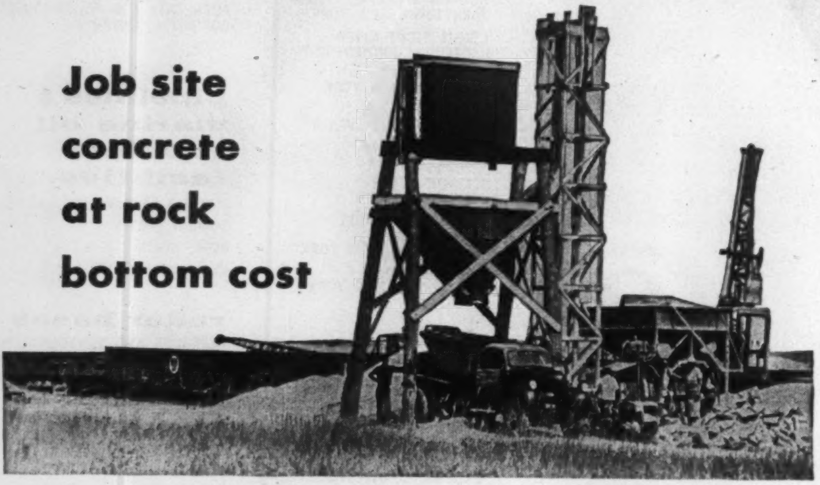
J. L. E. Price & Co. Ltd., 4664 St. Catherine St. W., Montreal, Que., CA, **$438,000** (8 bidders) FACTORY, Metropolitan Blvd. and 14 Ave., MONTREAL, QUE. Federated Metals (Canada) Ltd., Don Roadway, Toronto, Ont. Bids Aug. 30, awarded Sept. 12. CD 8/22.

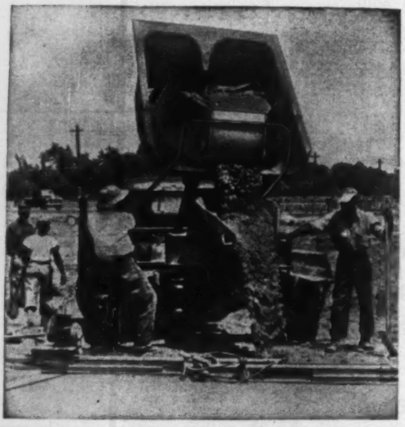
Tellier & Groleau, 184 Ste. Cecile St., Three Rivers, Que., CA, **$453,000.** SCHOOL and AUDITORIUM, Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids Aug. 23, awarded Sept. 9. CD 8/5.

▲ **Community Enterprises Ltd.**, 5665 Pare St., Montreal, Que., CA, **$1,511,487** (8 bidders) 130 rein.-con. APARTMENT UNITS, Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids Aug. 2, awarded Sept. 9. CD 7/12.

(Continued on page 342)

Job site concrete at rock bottom cost





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Perlite-concrete design

Lightweight Insulating Fireproof Concrete Roof Deck Specification Manual—By Dale A. Lehr, 218 pp. Perlite Division, Great Lakes Carbon Corp., 612 So. Flower St., Los Angeles 17, Calif. Limited free distribution.

Building designers will find very useful this new manual on perlite concrete for roof decks, in which, for the first time is taken an authoritative and sound engineering approach to a subject of growing importance. The book contains numerous tables and diagrams of roof construction that simplify design. A looseleaf binder enables supplementary information to be added later, when available.

Perlite aggregate, formed by "popping" a siliceous volcanic rock at 1,500 F, weighs less than one-tenth as much as sand or gravel. It can be used alone as a non-structural insulation fill or mixed with portland cement and water to form a lightweight structural concrete of high insulative value. The book presents data for both types of application.

Design tables in the manual enable a designer to pick out the thickness of roof deck required for various mixes to obtain a desired overall insulation value. The compressive strength of the slab also is given, thus enabling the designer to check the thickness for load-carrying capacity.

The tables give coefficients of heat transfer (U-values) for slabs on permanent forms of various types, on metal lath and on paper-backed wire mesh. The effect of ceilings is taken into account. Accompanying drawings show details of the various types of construction.

Also included in the manual are typical specifications and recommendations for mixing, handling and testing perlite concrete, technical data for subpurlins and a discussion of commonly encountered problems, with suggestions for avoiding or correcting them.

"Engineering News-Record" 6/29/54

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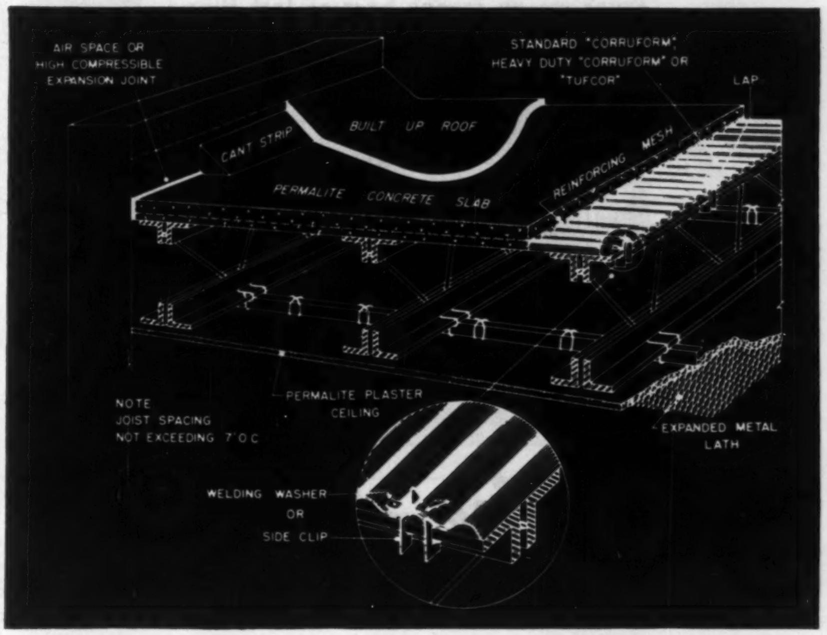

The big, new Permalite Roof Deck Manual gives you, for the first time, *complete, factual, reliable data* on the use of lightweight, insulating concrete in open-web roof deck construction. Leading architects and designers agree that this 220-page volume provides complete engineering information in easy-to-use form . . . all the different roof forms and types of suspended ceilings, with page after page of tables on slab thickness, weights, strengths and U-factors, already worked out for you to make specifying quick, easy and accurate. You can get this authoritative handbook, packed with usable, every-day working information, from the Permalite franchisee serving your area – for his name and address

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(Continued from page 340)

▲ **Cap Construction Ltd.,** 299 Blvd. Ste. Madelein, Cap de la Madelein, Que., CA, **$1,242,042** (12 bidders) 142 HOUSING units at Canadian Army Camp, VALCARTIER, QUE. Central Mortgage & Housing Corp., 940 Cote de Liesse Rd., Montreal, Que. Bids July 26, awarded Sept. 9. CD 7/12.

▲ **Dawson & Hall, Ltd.,** 775 Clark Dr., Vancouver, B. C. LB **$4,256,738,** Alt. **$4,262,232.** 120-bed HOSPITAL, incl. NURSES RESIDENCE, STAFF QUARTERS, POWER HOUSE LAUNDRY, etc., WHITEHORSE, YUKON TERRITORY. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Aug. 24. CD 7/19.

U. S. POSSESSIONS

HEAVY CONSTRUCTION—BA

† **Virgin Islands**—BA 10/20—Office of the Director, Virgin Islands P. Wks., Div. of Insular Affairs, Office of Territories, Dpt. Interior, Charlotte Amalie, St. Thomas, Virgin Islands, Proj. No. 53-103, constr. addnl. sect. intercepting sewer, paralleling existing 18 in. vitr. clay intercepting sewer, or meandering in the same general direction, from vicinity of NY Tvaer Gade to lift station near the French Village, to incl. one rein.-con. grit chamber; 11 concrete manholes; hauling and installing only, 260 lin. ft. 8 in., 500 lin. ft. 10 in., 1,070 lin. ft. 18 in. and 440 lin. ft. 20 in. pipe, Charlotte Amalie, St. Thomas. Plans deposit $20. R. L. Kenan & Assocs., Bell Bldg., Montgomery, Ala., consult. engrs.; adv. ENR 10/6.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

▲† **Enterprise Division of General Metals Corp.,** 18 and Florida Sts., San Francisco, Calif., U.S.A., CA **$1,500,000.** diesel engine generator sets, incl. large six and eight cylinder diesel engines with electric generators at Torrejon, San Pablo, Zaragoza and Moron Air Bases, for Bureau Yards & Docks, Dpt. Navy, 18 St. and Constitution Ave. N.W., Wash. 25, D. C., SPAIN. Brown-Raymond-Walsh, 122 E. 42 St., New York, N. Y., U. S. A., and Madrid, Spain, prime contractors.

Proposed Projects

WATER SUPPLY

▲ **Calif., Cucamonga**—Cucamonga County Water Dist., Cucamonga, voted **$1,200,000** bonds Aug. 30, water main construction. CD 8/22.

▲ **Calif., San Diego**—Valley Center Municipal Water Dist., San Diego, voted **$1,600,000** bonds Aug. 30, water distr. sys. CD 8/2.

Nev., Henderson—City, City Hall, voted **$550,000** bonds, sewerage sys.

SEWERS, WASTE DISPOSAL

▲ **Colo., Pueblo**—City, City Hall, sewage treatment plant. **$1,080,000.** Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 10/12/53.

▲ **Ga., Atlanta**—City, City Hall, sewage disposal plant to serve Adamsville, Simpson Road-Collier Road area **$150,000,** sewage disposal plant for Riverside area, **$150,000,** Wiedeman & Singleton, 760 W. Peachtree St. N. W., Atlanta, consult. engrs.; sewage disposal plant in College Park Section, **$1,200,000.** CD 7/23/54.

Ky., Hopkinsville—City, Contr. A, addn. to sewage treatment; Contr. B, sanitary sewers, **$750,000,** Howard K. Bell, 555 S. Limestone St., Lexington, consult. engr. Bids in 60 to 90 days. CD 4/11/51.

▲ **Mo., St. Louis County**—Metropolitan Sewer Dist., L. E. Ordelheide, exec. dir., 506 Olive St., St. Louis, Zone 1, 8 mi. trunk sanitary sewer ranging from 18- to 24-in. up to 5 ft. in Maline Creek sewer area in northwestern part of county, **$1,000,000,** Pitzman's Co of. Surveyors & Engineers, 804 Pine St., St. Louis, Zone 1, consult. engrs. CD 10/16/51.

▲ **Mo., St. Louis County**—Metropolitan St. Louis Sewer Dist., L. E. Ordelheide, exec. dir., 506 Olive St., St. Louis, Zone 1, constr. 8 mi. sanitary trunk sewer ranging from 36 in. to 5x6 ft. rein.-con. box section and also sewage treatment plant in Coldwater Creek area in northwestern part of county, **$1,000,000.** CD 9/14/53.

Nev., Henderson — City, City Hall, voted **$750,000** bonds, water imprvs.

STREETS AND ROADS

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

Orange Co.—5.9 mi. arterial route system within the city of Port Jervis and hy. connections outside of city, **$3,190,000.**

Wash., Prosser—Benton Co., Court House, road construction in Kennewick Highlands Irrigation Project, **$750,000.** D. Bean, engr.

EARTHWORK, WATERWAYS

▲ † **Georgia and South Carolina**—U. S. Eng., 200 East St. Julian St., Savannah, Ga. Hartwell Dam on Savannah River. Total **$94,000,000.** $3,000,000 Appropriated.

▲† **Kansas**—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., Stage III Tuttle Creek Reservoir, incl. left and right bank embankment, sections, spillway excav. and replacing construction bridge, **$7,500,000.** Bids in October. CD 6/1/44.

† **Maryland**—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., constr. 3 flood control pumping stations on Ancastia River, Edmonston, Bladensburg and Colmar Manor, **$500,000-$1,000,000.** CD 3/11.

▲ **Massachusetts**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, development North Shore of Plum Island, Newburyport, **$731,900;** development Watson's Pond, Taunton, **$350,000.**

▲† **Washington**—Bureau Reclamation, Dpt. Interior, Ephrata, irrigation facilities on Columbia Basin Proj. near Quincy, Othello and Connell, Grant, Adams and Franklin Counties, **$12,500,000.** Work to begin next year.

▲† **West Virginia—U. S. Eng., Box 2127, 237 4th** Ave., Huntington, plans by Gannett Fleming, Corddry & Carpenter, Inc., 600 N. Second St., Harrisburg, Pa., Sutton Dam, Sutton. CD 8/18.

AIRPORTS

▲† **Ala., Mobile**—DORMITORIES, etc.—U. S. Eng., 2301 Grant St., Mobile, runway, **$300,000-$1,000,000,** airmens' dormitories **$1,000,000-$5,000,000,** Bids About December; avgas bulk storage, **$300,000-$1,000,000.** Bids About September, above work at Brookley Air Force Base.

▲† **Ala., Selma**—RUNWAY—U. S. Eng., P.O. Box 1169, Mobile, Zone 7, runway **$1,000,000-$5,000,000,** Bids About February; airmens dormitories **$300,000-$1,000,000,** Bids About October, above work at Craig Air Force Base.

▲† **Fla., Fort Myers**—WARM-UP PAD, etc.—U. S. Eng., P.O. Box 4970, Jacksonville, warm-up pad and runway **$1,000,000-$5,000,000;** airmens' dormitories, **$1,000,000-$5,000,000;** officers' quarters, **$300,000-$1,000,000,** Bids about November; field maintenance hangar, **$300,000-$1,000,000;** organizational hangar **$300,000-$1,000,000,** Bids About January, above work at Buckingham Weapons Center.

▲† **Fla., Homestead**—APRON, etc.—U. S. Eng., P.O. Box 4970, Jacksonville, access apron and RW shoulders, **$300,000-$1,000,000,** Bids About September; hydrant refueling sys. **$300,000-$1,000,000,** vehicular parking **$300,000-$1,000,000,** officers club **$300,000-$1,000,000,** Bids about November, above work at Homestead Air Force Base.

▲ **Fla., Orlando**—AIRPORT IMPRVS.—U. S. Eng., P. O. Box 4970, Jacksonville, access apron and shoulder stabilization, **$300,000-$1,000,000;** organizational maintenance shop, **$300,000-$1,000,000.** Bids about September; operations facility, **$1,000,000-$5,000,000.** Bids about January, above work at Pinecastle Air Force Base. CD 1/31/51.

▲† **Kan., Salina**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., warmup pad

(Continued on page 345)

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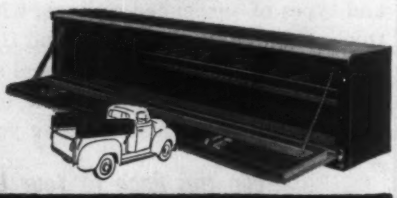

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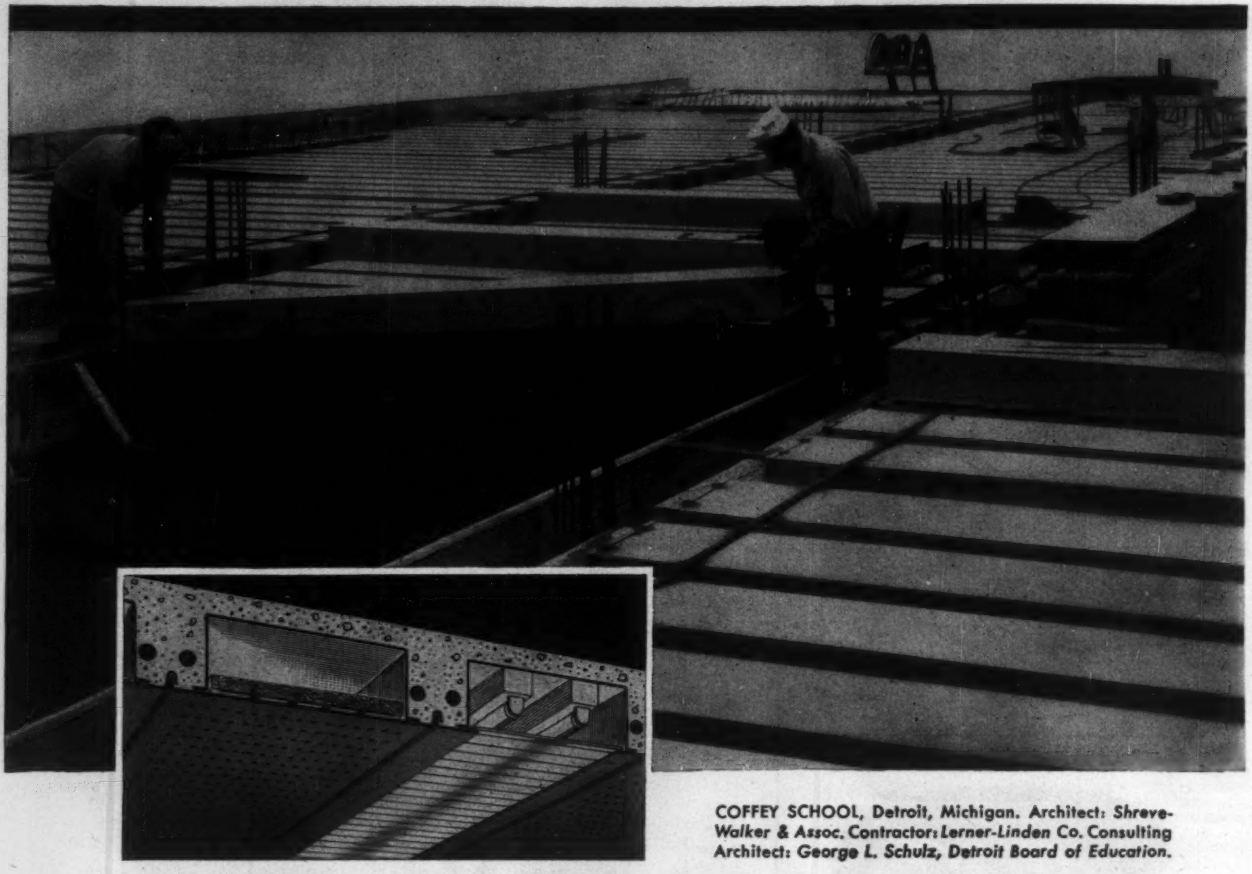

COFFEY SCHOOL, Detroit, Michigan. Architect: Shreve-Walker & Assoc. Contractor: Lerner-Linden Co. Consulting Architect: George L. Schulz, Detroit Board of Education.

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(Continued from page 342)

$200,000, primary runway $800,000; fire station $200,000; shop and A&E $200,000 and shop, org. maintenance $600.000. Bids in September [illegible] maintenance $3,200,000; officers quarters $200,000, and parachute shop $200,000, Bids in October; dental clinic $200,000, and gymnasium $400,000, Bids in November, foregoing work at Smoky Hill Air Force Base. CD 5/19/52.

▲† **Kan., Topeka**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., stabilized shoulder R/W $500,000, operations, base $200,000, shop, field maintenance (gen. purpose) $300,000, storage, flyaway kits $200,000, storage ordnance base $100,000 warehouse, bulk supply $300,000, and parachute shop $200,000, Bids about September; dental clinic $200,000 and club, NCO $300,000, Bids about October; jet hydrants $200,000 shop, field maintenance (A&E) $200,000, and hydrant $100,000, Bids about November; hospital, $3,100,000, Bids about December, foregoing work at Forbes Air Force Base. CD 10/8.

▲† **Miss., Columbus**—RUNWAY, etc.—U. S. Eng., 2301 Grant St., Mobile, Ala., airfield paving runways, $1,000,000-$5,000,000, Bids in October; airmen's dormitories, $300-000-$1,000,000, Bids in December, above work at Columbus Air Force Base.

▲† **Mo., Grandview**—APRON, PARKING, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., apron, parking, $500,000, Bids about October; hangar, field maintenance, $1,300,000, Bids about November; swimming pool, $200,000, Bids about January; shop, reserve hangar (AFRTC), $200,000, Bids about December; utilities, $100,000, Bids about November, above work at Grandview Air Force Base. CD 6/30/52.

▲† **Mo., Sedalia**—AIRPORT IMPRVS.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., A&E shop $100,000, commissary $100,000; service club $200,000, Bids about September; multi-purpose hangar, $500,000, Bids about October; warehouse, bulk supply, $200,000, Bids about November; runway, primary $1,800,000, stabilized shoulder $600,000, and sewage treatment plant $600,000, Bids about December, foregoing work at Sedalia Air Force Base. CD 1/6/54.

▲† **N. C., Fort Bragg**—PARKING APRONS, etc.—U. S. Eng., 308 Customhouse, Wilmington, parking apron, $1,000,000-$5,000,000, Bids in October; airmen's dormitories, $300,000-$1,000,000, Bids about November, above work at Pope Air Force Base.

▲† **N. C., Goldsboro**—HANGAR, etc.—U. S. Eng., 308 Customhouse, Wilmington, multi-purpose hangar, $300,000-$1,000,000, Bids About February; field maintenance hangar, $1,000,000-$5,000,000, Bids about September, 1956; hospital $1,000,000-$5,000,000, Bids About December, above work at Seymour Johnson Air Force Base.

▲† **S. C., Charleston**—AIR BASE BLDGS., etc.— U. S. Eng., Custom House, gymnasium, $300,000-$1,000,000. Bids about October 1955; squadron headquarter bldgs., $300,000-$1,000,000, Bids about October 1955; airfield paving runway, $1,000,000-$5,000,000, Bids about January 1956, above work at Charleston Air Force Base. CD 11/14/52.

† **S. C., Sumter**—PAVING, etc.—U. S. Eng., Customhouse, Charleston, airfield paving parking apron, Shaw Air Force Base, $300,000-$1,000,000. Bids about September 1955. CD 9/25/51.

† **Tenn., Smyrna**—PAVING—U. S. Eng., 306 Federal Office Bldg., Nashville, airfield paving, parking apron, Seward Air Force Base. $300,000-$1,000,000. Bids about September 1955.

▲† **Tex., Ellington Air Force Base**—DORMITORY, etc.—U. S. Eng., Box 1229, Galveston, plans by Stone & Pitts, 1872 Calder St., Beaumont, dormitory, dining hall, electrical distr. sys., operational bldg., Ellington Air Force Base, $5,000,000. Carter & Burgess, 1872 Calder Ave., Beaumont, consult. engrs. CD 8/25.

▲ **Ont., Windsor**—TERMINAL—Dpt. Transport, Ottawa, terminal bldg. at airport, $1,000,000. CD 5/25/43.

LATIN AMERICA

Mexico, Tuxtla Gutierrez—Aria. de Comunicacione, Mexico City, plans airport. $500,000. CD 3/26/51.

Mexico, Vallarta—Aria. de Comunicaciones, Mexico City, plans airport. $500,000.

PUBLIC BUILDINGS

Calif., Bakersfield — COUNTY UTILITIES — Kern Co., Court House, plans by Wright, Metcalf & Parson, 2323 "E" St., county utilities bldg., incl. all mechanical equip. $600,000.

Calif., Fontana—SCHOOL—Fontana School Dist., Fontana, plans by J. Dewey Harnish, 222 E "B" St., Ontario, Junior High School. $500,000. CD 5/19/53.

Calif., Martinez—GYMNASIUM—Contra Costa Junior College Dist., 1005 Escobar St., plans by Donald Hardison & Assoc., 225 Broadway, Richmond, gymnasium for West Contra Costa Junior College, $500,000. G. M. Simonson, 507 Howard St., San Francisco, consult. engr.

Calif., Monrovia — SCHOOL — Monrovia-Duarte High School District, Monrovia, $970,000 bond election Nov. 8 (first unit) of Duarte High School. CD 6/1.

Calif., Ontario—SCHOOL—Ontario Elementary School Dist., Ontario, plans by J. Dewey Harnish, 222 E. "B" St., School Plant No. 3, Benson and Kingsley Aves. $500,000.

Calif., Pasadena — ADMINISTRATION — Pasadena Bd. Educ., 351 S. Hudson Ave., plans by Neptune & Thomas, 1560 W. Colorado St., 3 story administration bldg. addn. $530,000.

▲ **Calif., San Jose**—HOSPITAL, etc.—Santa Clara Co., Court House, $5,125,000 bond election Oct. 25,

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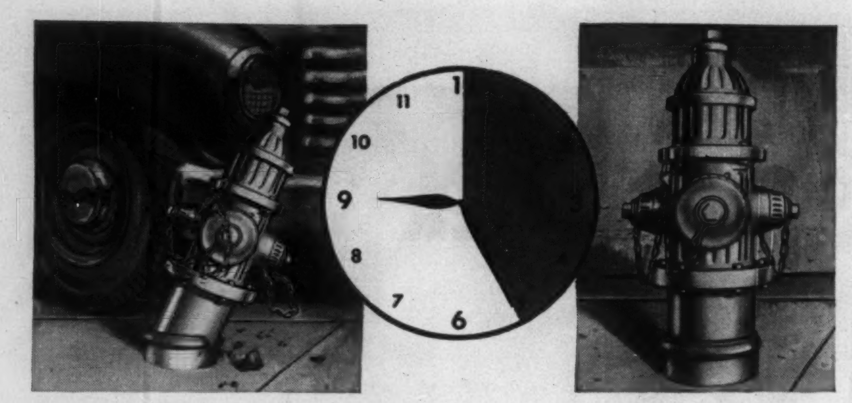

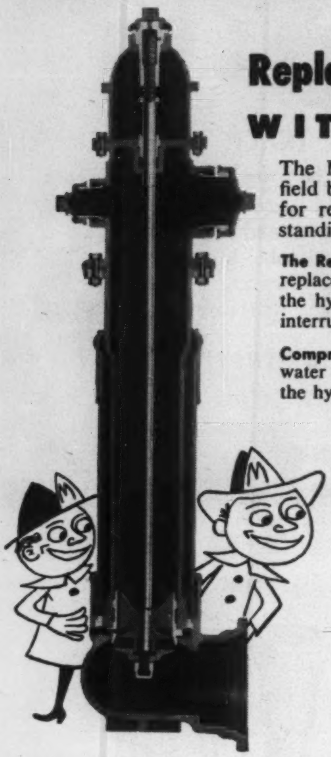

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▲ **Calif., San Mateo**—SCHOOLS—San Mateo City Elementary School District, 117 N. San Mateo Dr., **$2,000,000** bond election Nov. 8, schools, CD 3/20/53.

Calif., Sebastopol—SCHOOL—Gravenstein Union School Dist., Cunningham, plans by Hammond & Woodbury, 530 3 St., San Rafael, 23,000 sq. ft., frame school. **$650,000.**

Calif., Stockton—SCHOOLS—Lincoln Unified School Dist. c/o Supt., 818 Lincoln Rd.; **$900,000** bond election Nov. 19, high school and elementary school. CD 3/11.

Colo., Boulder—SCHOOL—Fairview Consolidated School Dist., Boulder, voted bonds Aug. 30, school, Cherryvale Rd. **$550,000.** Atchison & Kloverstrom, 257 Josephine St., Denver, consult. engrs. CD 8/9.

▲† **Colo., Denver**—PLANT EXPANSION—Atomic Energy Comn., 1901 Constitution Ave. N.W., Wash. 25, D. C., plans by Catalytic Constr. Co., archt.-engr., 1528 Walnut St., Phila., Pa., Rocky Flats Plant expansion, incl. two new buildings and related facilities, modification, 3 existing buildings **$13,500,000.** Dow Chemical Co., Midland, Mich. will operate this plant for AEC.

† **Ill., Danville**—THEATER—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C.; theater bldg. for Veterans Admin. Hospital. **$750,000.**

▲† **Kan., DeSoto**—BUILDING—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., bldg., **$1,000,000.** Bids about February; misc. constr., **$500,000,** Bids about January, above work at Sunflower Ordnance Works.

▲† **Kan., Fort Leavenworth**—HOSPITAL—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., hospital, **$2,700,000.** Bids about May. CD 10/31/46.

▲† **Kan., Fort Riley**—QUARTERS, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., family quarters, **$2,800,000,** Bids about December; hangar and hardstand, **$500,000,** Bids about March; ammo igloos, **$100,000,** Bids about January; barracks **$3,500,000,** headquarters bldgs. **$200,000,** motor park facility and hardstand **$100,000;** motor repair shops **$300,000,** regimental dispensary $100,000, all foregoing Bids about April; classrooms, **$200,000** and PX, service club and theater, **$900,000,** Bids about June.

Md., Towson—SCHOOL—Baltimore Co. Bd. Educ., Aigburth Rd., plans by Buckler, Fenhagen, Myer & Ayers, 2315 St. Paul St., Baltimore, Zone 18, 2 story, brick, stone, steel, rein.-con. Riverview School, near Essex, **$500,000.**

Mass., Rockland—SCHOOL—Town, School Bldg. Comn., c/o Supt. Schools, plans by J. Williams Beal & Sons, 185 Devonshire St., Boston, Senior High School, **$600,000.** (**Correction**—location of project). CD 9/9, under Mass., Brockton.

Mass., Wrenthan—SCHOOL—Towns Wrenthan, Norfolk and Plainville, Regional School District, c/o Walter M. Gaffney, archt., W. Main St., Hyannis, constr. King Philip Regional High School, Franklin St. **$500,000.**

Minn., **Bird Island**—SCHOOL—Bd. Educ., C. H. Ninow, clk., voted $450,000 bonds Aug. 10, school addn. **$400,000.** Swanson, Matson & Wegleitner, 500 Sexton Bldg., Minneapolis, archts. CD 1/19.

▲ **Mo., Chillicothe**—POWER PLANT—City, c/o City Council, **$1,395,000** bond election Oct. 4, imprvs. municipal power plant.

▲ **Mo., Columbia**—DORMITORY—Curators of the University of Missouri, Jesse Hall, plans by Hellmuth, Obata & Kassabaum, 825 Locust St., St. Louis, Zone 1, dormitory, **$921,100,** cafeteria, **$246,000.** CD 3/1/46.

▲† **Mo., Fort Crowder**—MOTOR POOL FACILITY, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., motor pool facility, **$100,000;** family quarters, **$1,000,000.** Bids about December.

▲ **Mo., Normandy** (St. Louis 21 P. O.)—SCHOOL—Normandy School Dist., Bd. Educ., Ward E. Barnes, supt. Schools, 7837 Natural Bridge Rd., Zone 21, **$2,350,000** bond election Oct. 25, schools, addns., imprvs.

Mo., Rolla—DORMITORY—Missouri School of Mines & Metallurgy, Rolla, and c/o Curators of the University of Missouri, Jesse Hall, Columbia, plans by Hellmuth, Obata & Kassabaum, 825 Locust St., St. Louis, Zone 1, dormitory, **$635,000;** cafeteria, **$300,000.**

▲† **Mo., St. Louis**—Plant, etc.—U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo., lead styphante and tetracene plant, **$1,500,000,** Bids about May; water supply, Tyson Valley, **$100,000,** Bids about May; diesel repair shop, **$100,000,** Bids about January, above work at St. Louis Ordnance Plant. CD 10/19/53.

▲ **Nev., Las Vegas**—COURT HOUSE—Clark Co., Court House, voted **$4,000,000** bonds, Aug. 30, court house, Zick & Sharp, 1806 S. Main St., archts. CD 7/13.

▲ **Nev., Reno**—COLLEGE BLDG.—University of Nevada, Bd. Regents, Morrill Hall, plans by Edward S. Parsons, 950 Marsh Ave., 4-unit College of Agriculture with administration and extension offices. **$2,091,180.**

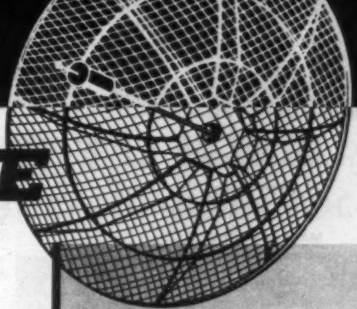
▲ **N. Y., New York**—BUILDINGS—Dpt. P. Wks., Municipal Bldg., Zone 7, plans by Chapman, Evans & Delehanty, 50 Broadway, Zone 4, Proj. C-71, Part A new bldgs., alterations and addns. for Penitentiary Division; Part B alterations and addns. to existing bldgs. for Div. for Rehabilitable Adults, at Rikers Island Workhouse and Penitentiary, **$9,400,000.** CD 11/15/44.

▲† **N. C., Fort Bragg**—HOUSING—U. S. Eng., 308 Customhouse, Wilmington, 490 units family housing. **$5,000,000.** Bids About November. CD 12/26/51.

▲ **O., Akron**—EDUCATIONAL, etc.—Children's Hospital, Roger Sherman, admin., W. Bowery and W. Buchtel

(Continued on page 348)

PEERLESS PUMPS



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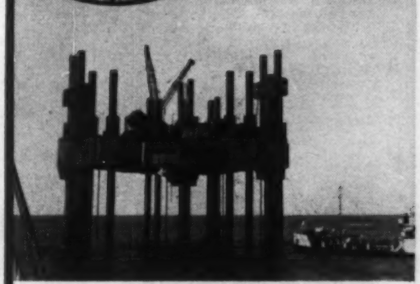

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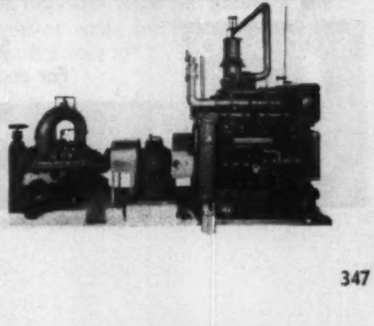

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(Continued from page 346)

Sts., plans by Wagner & Luxmore, Permanent Bldg., education bldg., Bowery St., **$500,000**; addns. to present mechanical bldg. and laundry, **$175,000**; enlarging clinic and emergency section, **$344,000.**

O., **Massillon**—SCHOOL—Bd. Educ., Massillon, Franklin School, **$725,000,** Dalton & Dalton, Old Arcade, Cleveland, Zone 14, consult. engrs. CD 11/18.

Okla., **Bartlesville**—SCHOOL—Bd. Educ., Bartlesville, bond election Oct. 18, elementary school. **$625,000.** Geo. Rens, Bartlesville, archt.

▲ Pa., **Ardmore**—SCHOOL—Lower Merion School Dist., Ardmore, plans by Vincent G. Kling, 917 Corinthian Ave., Phila., Senior High School, **$3,000,000.** CD 11/5.

▲ Pa., **Erie**—SCHOOL—School Dist. of Erie, Pub. Library Bldg., **$1,000,000** bond election Nov. 8, 2 story, part bsmnt., brick Jo Ann Connell Grade School. Wm. Brennan, 315 Marine Bank Bldg., archt. CD 8/25.

Pa., **Larchmont**—SCHOOL—Marple Twp. School Bd., Broomall, plans by Baader Young & Schultze, 1500 Walnut St., Phila., elementary school. **$517,700** Bids 10/4 on test borings. Chester I. Duncan, 225 S. 15 St., Phila., engr. CD 4/26.

▲ Pa., **Pine Bank**—SCHOOL—New West Green School Dist., Pine Bank, plans by Beal & Parking, 601 Washington Trust Bldg., Washington, Junior Senior High School Center Twp. **$1,500,000.** Constr. in 1956.

▲ Tex., **Temple**—SCHOOLS—Temple Independent School Dist., c/o Newman Smith, supt., plans by Wyatt C. Hedrick Co., 1200 T & P Bldg., Fort Worth, two Junior High Schools, Dunbar High School addns. and two elementary schools addns. **$1,550,000.** CD 3/3.

Vt., **Brattleboro**—SCHOOL—Brattleboro School District, c/o Supt. Schools, 96 Green St., plans by Benhard Dirks, Mohawk Trail, Greenfield, Mass., grammar school in West Brattleboro, **$500,000.**

▲ Va., **Fairfax**—SCHOOLS—Fairfax County Bd. Educ., Court House, Fairfax, bond election Nov. 8, school constr. **$22,000,000.**

▲ Wash., **Longview**—WAREHOUSE—Port of Longview, Longview, 60,000 sq. ft. warehouse space and berthing for addnl. ships, **$1,300,000.**

▲ Wis., **Mendota**—HOSPITAL—State Dpt. P. Welfare, madison, plans by Roger C. Kirchhoff, state archt., Madison, hospital, **$4,300,000.** Bids in 1956.

COMMERCIAL BUILDINGS

Ala., **Birmingham**—APARTMENT—James W. Dewberry, 807 S. 20 St., plans by Allan L. Bartlett, 1779 Valley Ave., Zone 9, 44-unit apartment group in English Village Section. **$800,000.**

Ala., **Birmingham**—CHURCH, etc.—Hunter St. Baptist Church, 17 St. and 4 Court W., plans by George P. Turner, American Life Bldg., church-auditorium, air-conditioned, **$500,000.**

Calif., **Corona Del Mar**—MOTEL—Ingram, Collins & Blakesly, c/o Western Drafting Service, archt., 494 Newport Blvd., Newport Beach, 100-unit 2 story, 50,000 sq. ft., frame, stucco motel, **$500,000.** E. Zepelin-Springe, 494 Newport Blvd., Newport Beach, consult. engr.

▲ Calif., **Fresno**—HOTEL—California Hotel, John M. Lloyd, genl. mgr., plans by Stiles & Robert Clements, 1135 Van Nuys Bldg., Los Angeles, 2 story hotel and subterranean garage addn. **$1,100,000.**

▲ Calif., **Fresno**—HOTEL EXPANSION—Handlery Hotels, c/o Stiles & Robt. Clements, archts., 210 W. 7 St., Los Angeles, 2 story, 75-room hotel expansion incl. swimming pool, dining room, cocktail lounge, 200-car garage, 10 modern shops, **$1,100,000.** CD 12/30/52.

Calif., **Glendora**—HOSPITAL, etc.—Thomas Cosenino, 125 S. First Ave., Arcadia, 1 story, 32,000 sq. ft. hopsital and 16,000 sq. ft. medical bldg. **$500,000.**

▲ Calif., **Los Angeles**—SHOPPING CENTER—R. T. Moss, 227 S. Robertson Blvd., Beverly Hills, plans by W. E. Hillier, 227 S. Robertson St., Beverly Hills, 100,000 sq. ft. shopping center, 750-car parking, Tarzana, **$1,000,000.**

Calif., **Sacramento**—DWELLINGS—Fidelity Title Co., 811 J St., 27 one family dwellings in West Arden Oaks subdivision, at Watte Ave. and Cottage Way, **$540,000.**

Calif., **San Francisco**—HOSPITAL—St. Luke's Hospital, 27 and Valencia Sts., plans by Gardner Dailey, 442 Post St., 4 story, rein.-con. steel, hospital wing, Valencia and 27 Sts. **$800,000.** CD 4/25/51.

Calif., **San Francisco**—DISPATCH and AUDITORIUM HALL, etc.—San Francisco Bay Area Longshoremen's Memorial Assn., 150 Golden Gate Ave., plans by Henry Hill, 555 Clay St., dispatch and auditorium hall and administration bldg. **$600,000.** Isadore Thompson, 583 Market St., San Francisco, consult. engr. CD 1/19.

Conn., **Bridgeport**—HOSPITAL—Park City Hospital, George S. Hardy, chn. Bldg. Comn., 695 Park Ave. plans by Peter F. Petrofsky, 177 State St., 150 bed hospital, **$600,000.** Victor A. Frid, 862 Asylum Ave., Hartford, hospital consultant.

▲ Ill., **Champaign**—SHOPPING CENTER, etc.—Owner, c/o Mark Mercer Hotel, Danville Rd., Urbana, plans by Alfred H. Lasswith, 105 W. Green St., shopping center, motel, theatre, service station **$2,000,000.** CD 8/26.

Ill., **Wheaton** — SCHOOL — St. Frances Central High School, Wheaton, plans by Belli & Belli, 8 S. Dearborn St., Chicago, Zone 3, Catholic High School. **$750,000.**

▲ Ind., **Indianapolis** — SHOPPING CENTER — Gardner Lane Shopping Center, 46 and Shadeland Ave., shopping center, incl. 4 buildings with 30 units and 1,200 car parking area, **$1,000,000** or more.

▲ **Mich., Romeo**—SHOPPING CENTER—Edward Nordman, 117 S. Main St., shopping center, incl. 25 stores, Orchard Hills, **$2,000,000.**

▲ **Neb., Omaha**—SHOPPING CENTER—Brandeis Investment Co., 16 and Douglas Sts., shopping center, 72 and Dodge Sts., **$6,000,000-$10,000,000.**

▲ **N. J., Atlantic City** — MOTEL — 3400 Boardwalk Corp., att. Joseph G. Bradway, 3542 Atlantic Ave., Atlantic City, plans by J. Vaughn Mathis, Guarantee Trust Bldg., Atlantic City, motel, swimming pool and restaurant, **$1,000,000.** George R. Swinton, City Hall, city engr. CD 8/19.

▲ **N. J., Jersey City**—HOUSING—Urban Developers, Inc., c/o S. J. Kessler & Sons, archts., 551 Fifth Ave., New York 17, N. Y., slum clearance housing, comprising eight 16 story bldgs. for 2,000 families on tract bounded by Hudson Blvd., Summit Ave. and Newark Ave. and on adjoining tract opposite City Hall, **$16,000,000.**

▲ **N. Y., Bayport**—SHOPPING CENTER—Syndicate, Sydney M. Siegel, pres., 116-55 Queens Blvd., Forest Hills, plans by Gloster & Gloster, 253 Sunrise Hy., Rockville Center, shopping center, incl. 3 story department store, office, professional bldg., two supermarkets, drive-in-bank, 162 stores on 35 acre tract on northside of Montauk Hy. **$7,500,000.**

N. Y., Brooklyn — APARTMENT — Milan Development Corp., 26 Court St., Zone 2, plans by Philip Birnbaum, 12 E. 48 St., New York, Zone 17, 6 story apartment, 3402-24 Snyder Ave. **$773,300.**

N. Y., New York—OFFICE—Albert Levy & Martin Jaffe, c/o Wechsler & Schimenti, archts., 52 W. 46 St., Zone 19, 13 story office, Fourth Ave. and 28 St. **$750,000.**

O., Avon Lake—SHOPPING CENTER—Frielingsdorf Corp., Stop 65, Lake Rd., plans by Arnold A. Peterson, 3134 Euclid Ave., Cleveland, Zone 41, 53,240 sq. ft., shopping center, incl. 2 story bldg. with office space on second floor, 5-store unit, 1 store unit, Saddle Inn, **$750,000,** construction to start late this fall.

▲ **O., Bay Village**—HOMES—Scholz Homes, Inc., 2001 N. Westwood St., Toledo, 150 homes, on 74 acre site, **$4,500,000.**

▲ **O., Cincinnati**—HOSPITAL—Bethesda Hospital, Oak and Winslow Aves., hospital addn. to present facilities, **$1,500,000.**

▲ **O., Cincinnati** — HOSPITAL — Deaconess Hospital, Clifton and Straight Sts., hospital addn. **$2,800,000.** CD 12/1/49.

O., Cincinnati—HOSPITAL—Holmes Hospital, Eden and Bethesda Aves., hospital addn. **$950,000.**

▲ **O., Cincinnati**—HOSPITAL—Jewish Hospital, Burnet Ave., 9 story hospital addn., **$2,000,000,** constr. early in 1959; 2 story bldg. to extend clinical laboratories, 1½ story maintenance and storage bldg., **$780,000,** constr. early in 1957.

▲ **O., Cincinnati**—SHOPPING CENTER—Lang Bros, Inc., 5240 Lester Rd., 15-acre shopping center, Glenway Ave. and Werk Rd. **$2,000,000.** Nunlist & Frolicher, Traction Bldg., consult. engrs.

▲ **O., Cincinnati**—HOSPITAL—Our Lady of Mercy Hospital, Rowan Hills Dr., Mariemont, hospital addn. **$1,000,000.**

O., Cincinnati—HOSPITAL—St. Francis Hospital, Queen City Ave., hospital facilities addn. **$594,000.**

▲ **O., Cincinnati**—HOSPITAL—St. Mary's Hospital, 816 Betts St., hospital, **$4,500,000;** rehabilitation of hospital, **$500,000.**

▲ **O., Columbus**—HOSPITAL—White Cross Hospital, 700 N. Park St., plans by Inscho, Brand & Inscho, 44 E. Broad St., Columbus, and Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill., hospital, W. North Broadway and Olentangy River Rd. **$7,000,000.** CD 2/19/47.

O., Franklin—SHOPPING CENTER—Edwin A. Mayer, Franklin, shopping center, near golf course on north edge of city, **$500,000.**

▲ **O., Middleburg Heights**—STORE—Halle Bros. Co., 1220 Euclid Ave., Cleveland, Zone 15, 2 story, brick suburban store in Pearl Rd.-W. 130 St. shopping center, **$3,000,000,** Raymond Loewy, 488 Madison Ave., New York, N. Y., will design bldg.

▲ **O., Parkview**—APARTMENTS—Modern Home Building Co., Barney Schwarzer, pres., 4373 Clague Rd. N., Olmsted, 12 apartments, along Brookpark Rd. **$1,000,000.**

▲ **O., Parkview**—HOMES—Modern Home Building Co., Barney Schwarzer, pres., 4373 Clague Rd. N., Olmsted, 70 homes, W. 226, 7, 8 and 229 Sts. off Maple Dr., **$1,400,000.**

▲ **O., Parma**—HOMES—Craft Builders, 18032 Euclid Ave., Cleveland, Zone 12, plans by Louis J. Rotman, 31715 Vine St., Wickliffe, 280 homes, W. 121 St. and Pleasant Valley Rds., **$4,500,000.** Construction to start late October.

▲ **O., Parma**—HOMES—D & R Constr. & Realty Co., David Moskowitz, pres., 4575 Pearl Rd., Cleveland, Zone 9, plans by Nathan Bernstein, 4618 Euclid Ave., Cleveland, Zone 3, 150 homes, W. 115 and Pleasant Valley Rds. **$2,700,000.**

▲ **O., Solon**—SHOPPING CENTER, etc.—Max Marmorstein, National City Bank Bldg., Cleveland, Zone 14, shopping center, incl. 20 stores and parking facilities, 70 homes, Miles and SOM Center Rds. **$3,750,000.**

▲ **O., Youngstown**—CATHEDRAL—Most Rev. Emmet M. Walsh, bishop Catholic Diocese, 144 W. Wood St., plans by Diehl & Diehl, 120 Madison St., Detroit, Mich. St. Columba Cathedral, W. Wood St. and Elm St. **$1,000,000.** CD 9/23/54.

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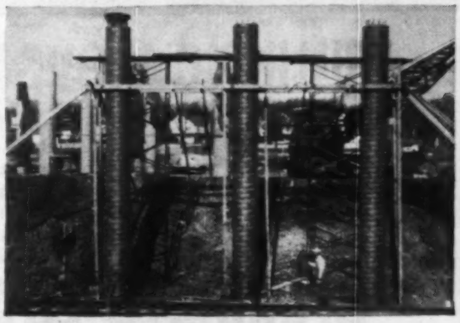

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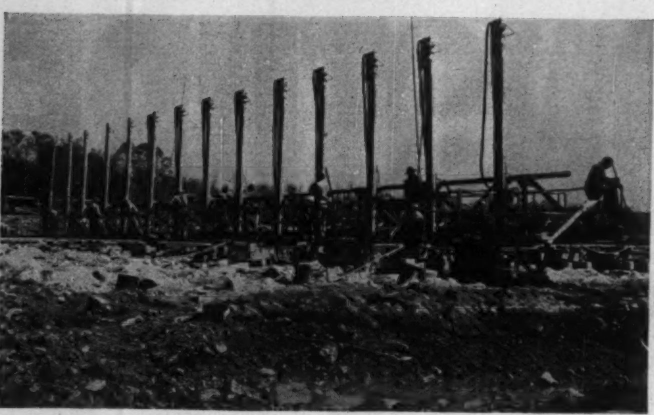

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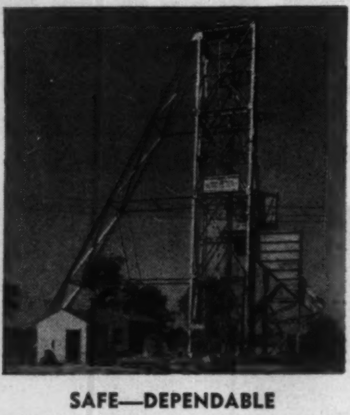

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▲ **R. I., East Providence**—SHOPPING CENTER—Syndicate, c/o Fred Podren, 143 Newbury St., Boston, Mass., plans by Sumner Schein, 271 Huntington Ave., Boston, Mass., shopping center, approx. 50 stores, roads, grading, etc., junction Pawtucket and Taunton Aves. **$4,000,000.** CD 6/30/53.

▲ **Tex., Austin**—APARTMENT-HOTEL—American Guaranty Underwriters, Inc., c/o Ben Medow, chn., 1010 Brazos St., plans by Fred Buford & Assocs., 326 Interurban Bldg., Dallas. 8 story, masonry apartment-hotel, **$1,500,000.**

▲ **Tex., Houston**—APARTMENT—Louis Cowan, 5201 Fannin St., plans by Wyatt C. Hedrick, consult. engr.-archt., 5201 Fannin St., 850-room brick exterior, terra cotta trim, concrete frame apartment, Hermann Dr. **$500,000.**

Wyo., Casper—OFFICE—Fred Goodstein, 1225 S. Center St., plans by J. Robert Bence & George Stein, 1733 Westridge Circle, 6 story L-shaped, 60,000 sq. ft. office bldg. **$750,000.**

▲ **Wyo., Cheyenne**—SHOPPING CENTER—City Center Shopping Center, 418 W. 7 St., shopping center, **$2,000,000.**

▲ **B. C., Vancouver**—SHOPPING CENTER—Woodward Stores Ltd., 101 W. Hastings St., plans by J. C. Page, 101 W. Hastings St., shopping center in South Cambie Street area, **$5,000,000.**

B. C., Vancouver—APARTMENT—Charles Glassman, 1280 W. Pender St., plans by G. Hamilton, 1280 W. Pender St., 6 story apartment. **$550,000.**

▲ **Ont., Toronto**—APARTMENT—Ennis Constr. Co., Ltd. 605 Briar Hill Ave., 10 story, 180-suite, masonry, steel, rein.-con. apartment, 66-74 St. George St. **$1,440,000.**

Ont., Toronto—APARTMENT—Sam Liebel & Wm. Engle, 12 Glen Cedar Rd., plans by Murray Sklar, 165 Spadina Ave., 7 story, bsmnt., 86-suite steel, brick apartment, 86 Charles St. E. **$608,000.**

▲ **Que., Beaconsfield**—SHOPPING CENTER—Anchor Enterprises Ltd., 137 Cartier Ave., Pointe Claire, plans by Ben-Ami Shulman, 5174 Cote des Neiges Rd., Montreal, shopping center, Elm Ave. **$1,000,000.** CD 2/17.

▲ **Que., Montreal**—STORE—T. Eaton Co. Ltd., 677 St. Catherine St. W., plans by Gratton D. Thompson, 1241 Guy St., large extension of downtown department store, **$5,000,000.** Wiggs, Walford, Frost & Lindsay, 350 Sherbrooke St. W., consult. engrs.

▲ **Que., Montreal** — OFFICE — Isadore Feldman, 1396 Notre Dame St. W., plans by Greenspoon, Freedlander & Dunne, 4151 Sherbrooke St. W., 20 story office bldg., Dorchester St. W. and Drummond St. **$4,000,000.** Bids soon.

▲ **Que., Montreal**—CULTURAL CENTER—Slovak Community Center, c/o Steve Sura, 40 Morrison Ave., Town of Mount Royal, Montreal, cultural center, Dorocher and Jean Talon Sts. **$1,000,000.**

▲ **Que. Quebec City**—APARTMENT—Moise Darabaner, 213 Charest Blvd., 10 story, 129-suite apartment, Grand Allee, **$1,000,000.**

INDUSTRIAL BUILDINGS

Calif., Santa Susana — PRODUCTION FACILITY — Air Products, Inc., 4949 Hollywood Blvd., Los Angeles, plans by Daniel, Mann, Johnson & Mendenhall, 4201 Sunset Blvd., Los Angeles, liquid oxygen production facility. **$750,000.**

▲ **Iowa, Cedar Rapids**—POWER PLANT—Central Iowa Power Co-operative, 219½ 3 Ave. S. W., power plant, **$6,892,000.**

▲ **O., Shelby** — PLANT — Copperweld Steel Co., 37 Tiefeld St., Glassport, plant addn. at seamless tube plant, **$1,000,000.**

▲ **O., Warren**—PLANT—Copperweld Steel Co., 37 Teifeld St., Glassport, steel plant addn., incl. electric furnaces and primary mill with pits for heating steel. **$10,000,000.** CD 2/29/52.

▲ **Pa., Altoona**—PLANT—Veeder-Root, Inc., 25 Sargent St., Hartford 2, Conn., plant to mfg. computers, **$1,500,000.** Ford, Bacon & Davis, 39 Broadway, New York, N. Y., consult. engrs.

▲ **Pa., Glassport**—PLANT—Copperweld Steel Co., 37 Tiefeld St., Glassport, plant addn. at Cable and Wire Div. **$1,000,000.**

UNCLASSIFIED

▲ **Ga., Commerce**—PLANT—O. E. Szekely & Assocs., 5312 Westminister Ave., Phila., Pa., radar plant, **$1,000,000.**

▲ **Missouri** — RURAL DISTRIBUTION LINES — Laclede Electric Co-operative, Lebanon, imprvs., extens. to rural distr. lines in Laclede, Webster and Wright Counties, **$1,362,000.**

▲ **N. Y., New York**—MARGINAL WHARF—Dpt. Marine & Aviation, Pier A, North River, marginal wharf from Coenties Slip to old slip, East River, **$10,000,000.** Tippetts-Abbett-McCarthy-Stratton, 62 W. 47 St., Zone 19, engrs. CD 9/9.

▲ **O., Cleveland**—STADIUM, etc.—City, City Hall, Zone 14, stadium, **$3,500,000-$6,000,000;** swimming pool with seating facilities for 20,000, **$750,000.**

▲ **O., Warrensville Heights**—LABORATORY—Standard Oil Co., of Ohio, Midland Bldg., Cleveland, Zone 15, plans by Ralph Fletcher, Chagrin Falls, research laboratory on 84 acre site on Warrensville Center Rd., **$2,000,000-$3,000,000.** H. K. Ferguson Co., 1783 E. 11 St., Cleveland, Zone 14, consult. engrs. Bids in November or December. Constr. will start in Spring.

▲ **B. C. Chilliwack**—PLANT—Alfred B. McCorkie, Jr., Boston Bar, B. C., veneer plant. **$1,500,000.**

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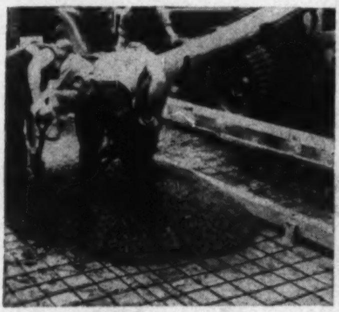
Close openings with VISQUEEN film. Work in warm comfort during cold or stormy weather.

"We could never have worked last winter without VISQUEEN film

Cover bulldozers, tractors, scrapers. Leave outdoors in any weather. Save thousands every winter on your equipment storage costs.



VISQUEEN film is best permanent moisture barrier under concrete floors. Lasts as long as the concrete. Widths to 20 feet.

You can't get a better curing blanket for concrete than VISQUEEN. Use it on floors, drives, paving, roads. Get even, stronger cure.

In late October 1954 virtually every opening in the library being erected at Rutgers University was closed with VISQUEEN film. Construction proceeded throughout a very tough winter, and long, cold spring. John Coleman, general superintendent said, "It would have been impossible to work the interior of the building (not only during the winter months but the spring as well) without adequate protection. And VISQUEEN was by far the best and least expensive I have ever encountered."

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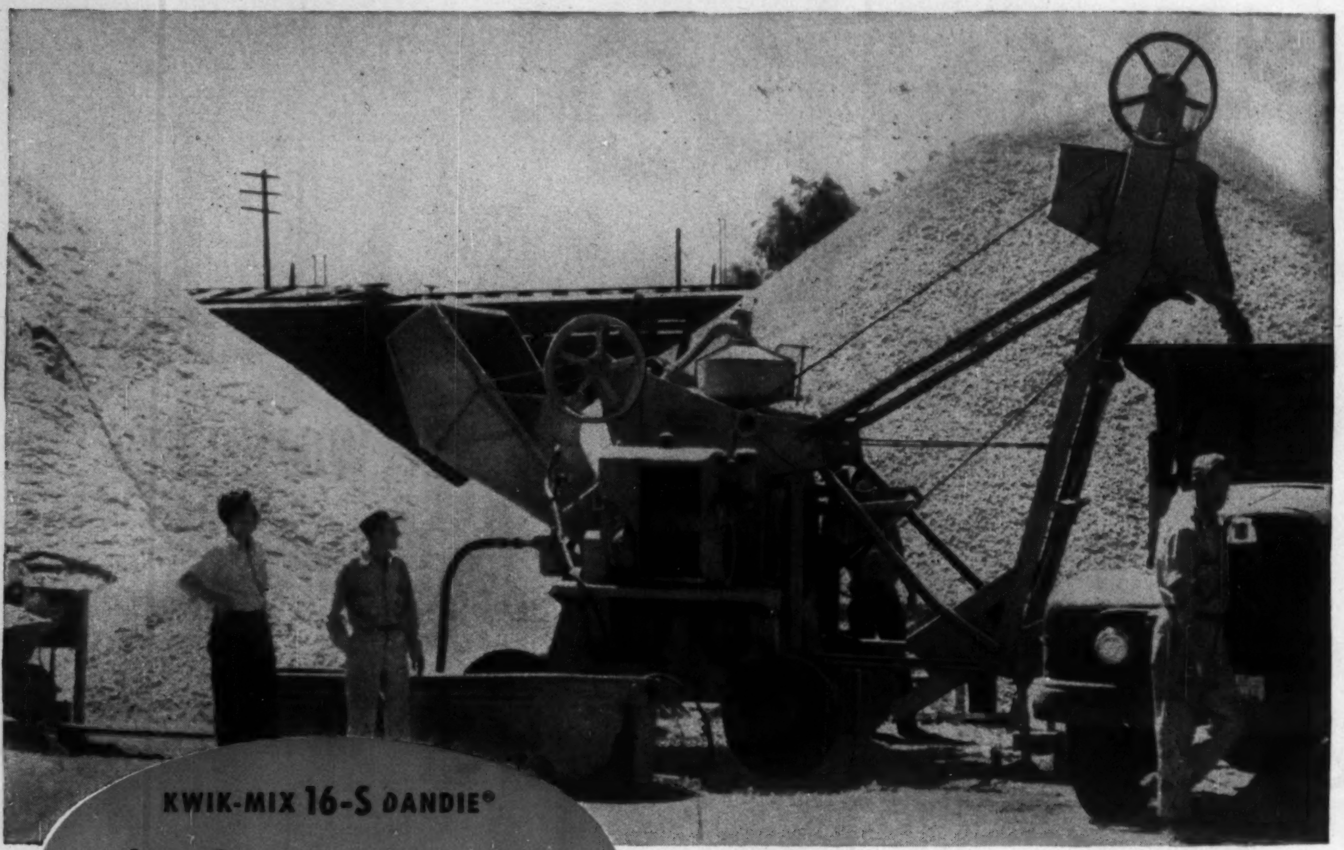
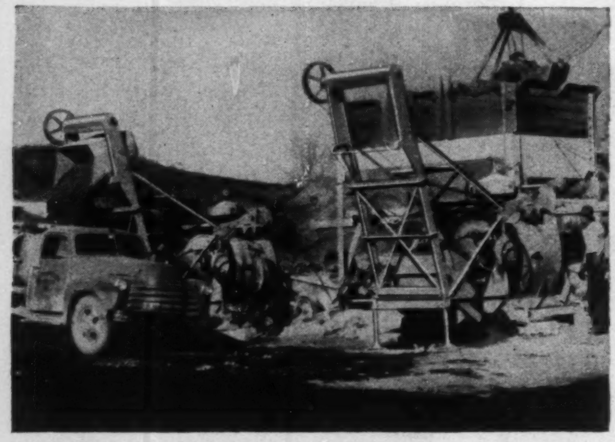


KWIK-MIX 16-S DANDIE®

handiest mixer you've ever seen

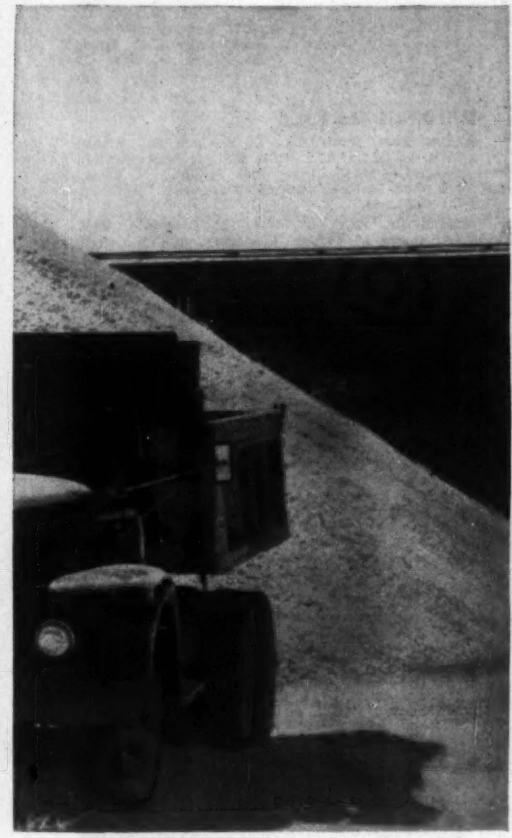
LOADS TRUCKS — Producing concrete for curbs and gutters, a Kwik-Mix 16-S Dandie mixer dumps batch directly into truck from ground level. Tower loader attachment gives 9 foot-2 inch discharge height. Big-capacity bucket holds full 17.6 cu. ft. mixer batch. It is powered by the mixer engine, dumps automatically at top of tower. Bucket travel and discharge are completed while the next batch is being



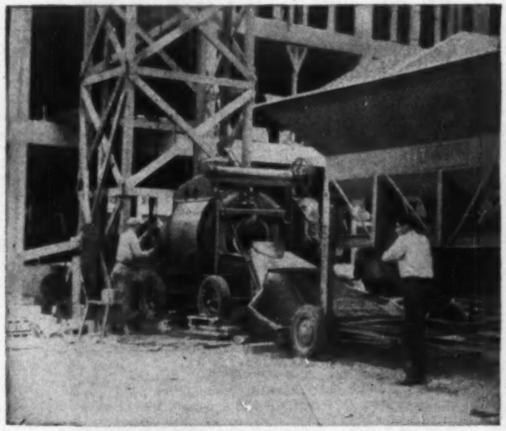
SETS UP AS CENTRAL-MIX PLANT — on bridge construction, two Kwik-Mix 16-S Dandie concrete mixers, with wheels removed, were set up side-by-side as permanent mix plants. Both were equipped with tower attachment for truck-loading operation. These big-capacity mixers also can be set up as stationary plants on elevated platforms by adding an extension track to charge the drum.

LOADS CONCRETE BUCKETS — Working on a state highway relocation project, this mobile 16-S Dandie mixed concrete for a series of box culverts — discharged batch into concrete bucket. To suit operating conditions, this versatile Kwik-Mix 16-S mixer is adaptable to side or end discharge. Axles are readily interchangeable on the square mixer frame. Change-over is easy, takes less than an hour.

KWIK-MIX COMPANY, Milwaukee 16, Wis. *(Koehring Subsidiary)* CKM536



mixed. There's no delay to mixer production. Tower is easily attached. Top section is hinged, folds back for ample travel clearance. Tower loader attachment is also available on the 11-S Dandie concrete mixer, and on Kwik-Mix 10 and 14 cu. ft. bituminous mixers.



TEAMS UP WITH BATCHER — Concrete for a new apartment building was produced on the job by this Kwik-Mix 16-S mixer and Johnson Lo-Bin batcher — a low-cost, big-production team. (Other sizes in Kwik-Mix line include: 11-S, 6-S, 3½-S Dandie mixers.)

Also: Plaster-mortar mixers, bituminous mixers, Moto-Bugs.®

Johnson ⅜ to 3-yard Clamshell Buckets

Smooth inside and out, Johnson all-welded clamshells dig and dump with less resistance . . . give fast clean discharge. They're quick-filling, easy-closing, because big needle bearing-mounted sheaves reduce friction loss, deliver full digging power to cutting edge. Hard manganese edge, welded to heavy lips, toughens with use. 3 types, 10 sizes: ⅜ to 3 yds. Also check Johnson line of concrete plants, bins, batchers, hoppers, silos.

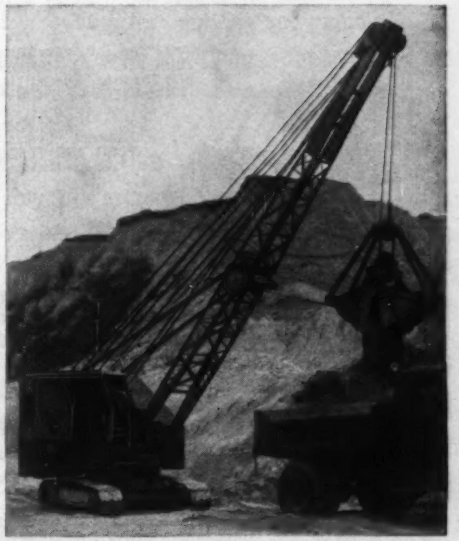
C. S. JOHNSON • Champaign, Ill.
(Koehring Subsidiary)

215 Trenchliner® digs 18 feet per min.

With 30 digging feeds, this cross-country 215 Trenchliner digs 6 in. to 18 feet per min., 13 to 31 in. wide, up to 6 ft. deep. Square or round-bottom buckets have "easy-in, easy-out" Tap-In teeth. Standard tractor-type crawlers have 18-in. treads, lug-type shoes. Other Parsons Trenchliners: wheel-type 202 for drainage and utility work; 3 ladder-types, full crawler mounted; and the mobile, utility size rubber-tired Trenchmobile®.

PARSONS • Newton, Iowa
(Koehring Subsidiary)

Koehring ½-Yd. 205 has 10 or 15-ton lift



On clamshell, dragline, or lift crane operation, you gain an important advantage in extra load capacity with Koehring heavy-duty 205. On crawler mounting, it has 10-ton lift capacity, and boom lengths of 30 to 50 feet. As a rubber-tired truck crane, it safely lifts up to 15 tons. Maximum boom length is 55 ft. Quickly converts to ½-yard shovel or hoe. Three other Koehring sizes up to 2½ yards . . . crane lift capacities up to 79½ tons.

KOEHRING Company
Milwaukee 16, Wisconsin

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
October 3 Connecticut October 4 Massachusetts

▲† **Me., Bangor**—AIRFIELD PAVEMENTS—BA 10/13—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., airfield pavements runway taxiway lighting, Dow Air Force Base, ENG.-19-016-56-24, $6,000,000. Plans deposit $25, refundable. Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York, N. Y., engrs. CD 9/12.

BUILDINGS—BA

Mass., Lexington—SCHOOL—BA 10/11—Town, 1475 Mass. Ave., high school addn., Waltham St. $925,000. Plans deposit $50, refundable, Perry, Shaw & Hepburn & Dean, 31 St. James Ave., Boston, archts. CD 11/4/48.

BUILDINGS—SLC

Mass., Brockton—BUILDING—West Fair Realty, 157 Main St., soon lets contract 200x300 ft. bldg., Belmont St. $500,000, Engineering Services, Inc., 844 Stevens Ave., Portland, Me., engr.-archt. Sears, Roebuck & Co., 201 Brookline Ave., Boston, Mass., lessee.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Mass.—**The Savin Constr. Corp.**, 10 Village St., East Hartford, Conn. LB **$7,401,331.** hy. and bridge Southeast Expressway, Dorchester;

Mass.—**J. F. White Constr. Co.**, 201 Alewife Brook Parkway, Cambridge, Mass. LB **$1,533,404.** hy. and brick Southern Circumferential Hy., Proj. U 229 (10), Canton. Bids Sept. 20. CD 9/12 and 8/31.

▲† **The Lane Constr. Corp.**, 965 E. Main St., Meriden, Conn., LB **$1,422,230**, est. $2,000,000. operational parking apron, plane wash disposal plant, Westover Air Force Base, ENG.-19-016-56-21, CHICOPEE FALLS, MASS. U. S. Eng., 857 Commonwealth Ave., Boston, Mass. Fenton G. Keyes Assoc., 267 Moody St., Waltham, Mass., archts. Haley & Ward, 73 Tremont St., Boston, Mass., engrs. Bids Sept. 16. CD 8/17.

BUILDINGS—LB & CA

▲ **Rugo Bros. Constr. Co.**, 80 Boylston St., Boston, Mass. LB **$1,533,000.** HIGH SCHOOL, Shawsheen Rd., ENDOVER, MASS. Town, High School Bldg. Comn., c/o Supt. Schools, Andover, Mass. Bids Sept. 15. CD 8/29.

Vappi & Co., Inc., 240 Sidney St., Cambridge, Mass. CA Approx. **$779,666.** Elementary SCHOOL, North Union and Everett Sts., East Arlington, ARLINGTON, MASS. Town, School Dpt., 23 Maple St., Arlington, Mass. CD 9/8, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 4 Maryland October 11 Delaware
STREETS AND ROADS
October 11 Delaware

BUILDINGS—BA

N. Y., New York—LAUNDRY—Bids Asked—Thomskil Realty Corp., 350 Gerard Ave., Zone 51, altering 4 story laundry, 344 Gerard Ave. $500,000, Charles Abrahams, 767 Lexington Ave., Zone 21, archt. CD 7/19.

HEAVY CONSTRUCTION—LB & CA

▲ **Lehigh Structural Steel Co.**, 17 Battery Place, New York 4, N. Y. LB **$1,004,190.** furnishing, fabrication, erecting structural steel for Kent Avenue Power Plant, Contr. P-127, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 9/6.

▲ **P. J. Carlin Constr. Co., Thomas Crimmins Contg. Co.**, and **Atlas Tile & Marble Works, Inc.**, 209 W. 38 St., New York 1, N. Y. LB **$1,478,945** (3 bidders) alterations, demolition, excavation and foundations for Kent Avenue Power Plant, New York City Transit Sys., Contr. P-126, NEW YORK. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 8/24.

Wortmann & Sons, Inc., 109 E. 29 St., New York 16, N. Y. LB **$218,291.** (9 bidders) Contr. NYA 690.003 garage, foam pump house, masonry wall at New York International Airport, IDLEWILD, N. Y. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Sept. 20. CD 9/14.

Tufano Constr. Corp., 32-17 Lawrence St., Flushing 6, N. Y. LB **$162,000.** (5 bidders) Contr. NYA-690.002 pavements and utilities and landscaping for fuel trucks parking facility at New York International Airport, IDLEWILD, N. Y. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Sept. 20. CD 9/14.

▲ **Rao Electrical Equipment Co., Inc.**, and **Arc Electrical Constr. Co., Inc.**, 314 E. 39 St., New York 16, N. Y. (3 bidders) LB **$2,123,000.** cable equip. and duct constr., Pelham Bay Line, IRT, Contr. P-99, NEW YORK, N. Y. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 16. CD 8/24.

† **Michael Contg. Co.**, 142 19 St., Brooklyn 32, N. Y. LB **$745,570.** (4 bidders) Special AAA Facilities, Cambria, NEW YORK. U. S. Eng., 111 E. 16 St., New York 3, N. Y. Bids Sept. 21. CD 9/9.

M. A. Bongiovanni, 309 Sunset Ave., Syracuse, N. Y. LB **$818,755.** sewers, SYRACUSE, N. Y. Onondaga P. Wks. Comn., Robt. W. Sollinger, purch. agt., Court House, Syracuse 2, N. Y. Bids Sept. 21. CD 8/29.

▲ **NEW JERSEY** and **PENNSYLVANIA**—Delaware River Port Auth., Administration Bldg., Bridge Plaza, Camden, N. J.,

Kaufman Constr. Co., Inc., 4000 Pulaski Ave., Phila., Pa., CA **$2,361,234.** Contract P-7, Walt Whitman Bridge-Phila. approaches, roadway grading, drainage 28 St. and Vare Ave. to Moyamensing Ave. and separation structures and City Street changes at Moyamensing and Passyunk Aves. for new bridge between Packer Ave., Phila., Pa. and Gloucester, N. J. Bids Sept. 15. CD 8/22.

NEW JERSEY—New Jersey Turnpike Auth., Administration Bldg., New Brunswick,

Louis Zimmerman, Jr., 278 Hillside Ave., Hillside, N. J., CA, **$624,045.** Contract 114, grading, drainage, paving Elizabeth Interchange, Maintenance Area No. 5, Service Area 11N and the Jersey City Interchange on N. J. Turnpike, Union and Essex Counties. Awarded Sept. 14. CD 9/15, under LB.

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg,

Ryan Brothers, Inc., Clearfield, Pa. CA **$1,097,861.** constr. 0.57 mi. (Sec. 37N) of northeastern extension in Abington Twp., Lackawanna Co. Bids Aug. 24. CD 8/26, under LB.

▲ **Rogers Constr. Co.**, R. D. Bell Mountain, Scranton, Pa. CA **$1,277,695.** Section 37K (south); CA **$1,060,650.** Section 37 K (north) and Section 37 L slushing mine areas on northeastern extension, PENNSYLVANIA. Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg, Pa. CD 8/12, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,

Allegheny Contg. Industries, Inc., 801 Bingham St., Pittsburgh 3, Pa. CA **$693,352.** constr. 21,792 ft.

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CITY________ STATE________

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crushed aggregate base with bit. surf. 22 ft. wide, LR. 17068 (3)-17069 (1), Clearfield Co. Bids Sept. 9, awarded Sept. 16. CD 9/14, under LB.

Highway Constr. Co., P. O. Box 4437, Wash. 17, D. C., LB **$125,976,** widening and paving roadway of "L" St. N. W. 12 to 15 Sts., WASH., D. C. D. C. Govt., Dpt. of Hys., 499 Pa. Ave. N. W. Wash., D. C. Bids Sept. 20.

BUILDINGS—LB & CA

Matson Ridge Homes, c/o N. M. Obedin Co., 124 Jackson St. Hempstead, N. Y. Owner Builds. **$400,000.** 40 HOUSES on tract at Rte. 27, BELLPORT, N. Y.

Cherrywood Homes, c/o Trylon Realty Co., 98-89 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$850,000.** 50 HOUSES on tract on Old Bethpage Rd., BETHPAGE, N. Y.

▲ **Lord Chesterfield Homes,** c/o Albert B. Meklenburg Org., 1038 Northern Blvd., Roslyn, N. Y. Owner Builds. **$3,000,000.** 300 HOUSES on tract at Suffolk Ave. and Willoughby St., BRENTWOOD, N. Y.

▲ **Alexander Muss & Sons,** Grohman's Lane, Plainview, N. Y. Owner Builds. **$10,000,000.** 1,000 HOUSES and SHOPPING CENTER on 350 acre tract on Montauk Hy., ISLIP, N. Y.

▲ **Ryan Contg. Co.,** 941 E. 79 St., New York 21, N. Y. CA Est. **$1,000,000.** 3 story PAROCHIAL SCHOOL and RESIDENCE for brothers, 1992-2024 Flatbush Ave., BROOKLYN, N. Y. R. C. Parish of St. Thomas Aquinas, 1550 Henderickson St., Brooklyn, N. Y. Bids Aug. 4. CD 7/26.

▲ **Benderson Development Co.,** 126 Franklin St., Buffalo, N. Y. Owner Builds. **$1,000,000.** 4 story HOTEL, Main and W. Tupper Sts., BUFFALO, N. Y.

Blackstone Arms, Inc., c/o Schulman & Soloway, archts., 100-15 Queens Blvd., Forest Hills, N. Y. Owner Builds. **$500,000.** 8 story APARTMENT, 89 Ave. and 168 St., JAMAICA, N. Y. CD 6/22.

Cuzzi Bros. & Singer, Inc., 160 E. 56 St., New York 22, N. Y. CA Est. **$350,000.** CONVENT and SCHOOL addn., Hone Ave., NEW YORK, N. Y. St. Clare's School, 1911 Hone Ave., New York 61, N. Y. Starrett & Van Vleck, 267 Fifth Ave., New York 16, N. Y., archts.

▲ **176 E. 77 St. Corp.,** 654 Madison Ave., New York 21, N. Y. Separate Contracts. **$2,000,000** [illegible]7 story APARTMENT, 1334-1344 Third Ave., southwest corner of 77 St., NEW YORK, N. Y. CD 6/17.

▲ **Rheinstein Constr. Co., Inc.,** 21 E. 40 St., New York 17, N. Y. CA Est. **$1,750,000.** 10 story BUILDING addn., Lexington Ave. and Sixth St., NEW YORK, N. Y. Associated Hospital Service, 80 Lexington Ave., New York, N. Y. CD 5/19/54.

▲ **Samuel Friedenberg & Son,** 161 William St., New York 7, N. Y. Separate Contracts. **$2,000,000.** 25 story OFFICE, 120 Williams St., and 79 John St., NEW YORK, N. Y. CD 4/6.

▲ **Lasker-Goldman Corp.,** 50 E. 42 St., New York 17, N. Y. LB **$1,767,000.** (11 bidders) general constr. LIBRARY of City College, South Campus (Manhattanville) NEW YORK, N. Y. Bd. Higher Educ., the City College Business Office, Brett Hall, 136 St. and Convent Ave., New York 31, N. Y. Bids Sept. 20, CD 8/9;
A. I. Smith, 1518 East New York Ave., Brooklyn 12, N. Y. LB **$344,783.** (10 bidders), electrical work (New York, N. Y.).

▲ **Morton C. Tuttle Co.,** 862 Park Square Bldg., Boston, Mass. CA Est. **$1,500,000.** 2 story OFFICE, Tenth Ave., WATERVLIET, N. Y. Behr-Manning Corp., 1933 Sidford St., Troy, N. Y. K. H. Ripnen Co., Inc., 440 Fourth Ave., New York 16, N. Y., archt.

▲ **J. J. Secoles, Inc.,** 274 Madison Ave., New York 16, N. Y. CA Est. **$3,500,000.** DEPARTMENT STORE, on 4 acre site bounded by Post Rd., South Broadway and Maple Ave., WHITE PLAINS, N. Y. Alexander's Department Store, Inc., Fordham Rd. and Grand Concourse, New York, N. Y. Ketchum, Gina & Sharpe, 227 E. 44 St., New York 17, N. Y., archts. CD 5/1/53.

Kingsland Estates Homes, c/o Peter R. Barna Agency, 1128 Main Ave., Clifton, N. J. Owner Buillds. **$760,000.** 45 HOUSES, BOONTON, N. J.

▲ **Max Drill, Inc.,** 60 Park Place, Newark, N. J., CA **$1,000,000.** 3 story LABORATORY, NEWARK, N. J. Beth Israel Hospital, 201 Lyons Ave., Newark, N. J. Kelly & Gruzen, 744 Broadway, Newark, N. J., archts.

E. B. Brown & Sons, Essex Falls, N. J., CA **$420,000.** CHURCH, SHORT HILLS, N.J. Community Congregational Church, c/o Ferrerz & Taylor, archts., 152 W. 42 St., New York 36, N. Y.

▲ **Becker Constr. Co.,** 361 Grove St., Newark, N. J., CA **$1,000,000.** FACTORY, Morris Ave., UNION, N. J. Schering Corp., Bloomfield Ave. and Broad St., Bloomfield, N. J. Frank Grad & Sons, 11 Commerce St., Newark, N. J., archts.

▲ **L. D. Building Co.,** Latrobe, Pa. LB **$1,794,000.** general contract ADMINISTRATION BLDG., HIGHSPIRE, PENNSYLVANIA. Pennsylvania Turnpike Comn., North Office Bldg., Harrisburg, Pa. Bids Sept. 20. CD 8/30;
Howard P. Foley Co., 312 Revere St., Harrisburg, Pa. LB **$344,400.** electrical work (Pennsylvania).

Mooney Bros., 133 Mahoning Ave., New Castle, Pa. CA Est. **$500,000.** 1 story, 140x180 ft., steel self-service SUPERMARKET, NEW CASTLE, PA. Joseph's Market, 13 E. Long Ave., New Castle, Pa. CD 6/30.

George H. Chilli Co., 805 Ann St., Homestead, Pa. CA Est. **$400,000.** 2 story, bsmnt., brick, block fraternity DORMITORY, PITTSBURGH, PA. Carnegie Institute of Technology, Schenley Park, Pittsburgh, Pa. Laurence

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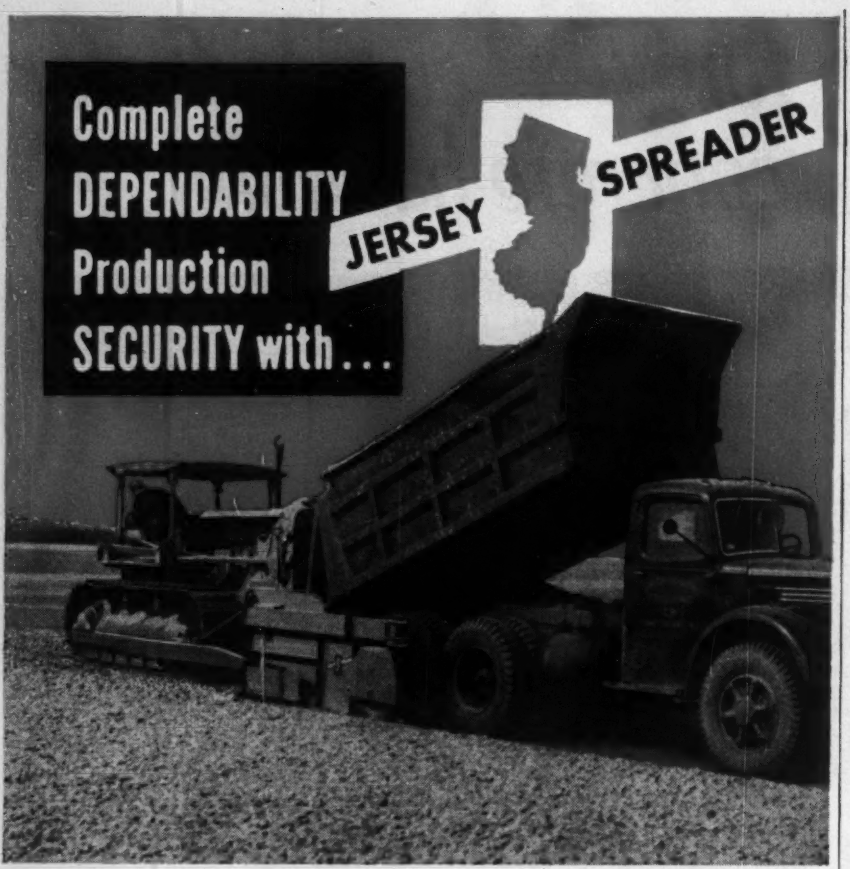

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Wolfe, 119 E. Montgomery St., Pittsburgh, Pa., archt. CD 11/3.

Ferraro Constr. Co., 523 N. Homewood St., Pittsburgh, Pa. CA Est. **$400,000.** 2 story, 50x174 ft., stone, steel Parochial SCHOOL, Brecelyn and Eymard Sts., PITTSBURGH, PA. Our Lady of Blessed Sacrament Church, c/o Marlier & Johnstone, archts., Empire Bldg., Pittsburgh, Pa. Bids Sept. 1. CD 8/29.

W. R. **Konkle**, 500 Wildwood Ave., Verona, Pa. CA 1 story, 80x700 ft., steel girder SHOP, VERONA, PA. Total est. **$500,000.** Ingalls Iron Works, Verona, Pa. J. Fred Treggo, 5777 Broad St., Pittsburgh, Pa., engr., CD 7/22;
O. H. Martin, 18 First St., Sharpsburg, Pa. CA 1 story, 80x220 ft., steel, L-shaped loading dock (Verona, Pa.).

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 12, November 16 Louisiana
STREETS AND ROADS
October 12, 26 Louisiana

BUILDINGS—BA

▲ **Fla., Tampa**—HOSPITAL—BA 10/27—Curtis Hixon, mayor and Bd. Representatives, City Hall, Tampa Municipal Hospital addns., alterations, Davis Islands. $3,980,691. Plans deposit $100. Norman F. Six, Hillsboro Hotel, Tampa, Eliot C. Fletcher, 404 Marion St., Tampa, and Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago 3, Ill., archts. CD 4/28/53.

▲ **La., New Orleans**—SCHOOL—BA 10/27—Orleans Parish School Bd., 703 Carondelet St., masonry, steel 104,000 sq. ft. Kohn Junior High School, 1800 and 1900 blocks of Bartholomew St. $1,227,624. Plans deposit $100. Freret & Wolf, 630 Gravier St., archts.

Ala., Birmingham—LIBRARY—Bids Asked—Howard College, 7725 Second Ave. S., 3 story, bsmnt, concrete, steel, brick library. $500,000. Van Keuren, Davis & Co., 3004 7 St. S., archts. CD 3/16.

HEAVY CONSTRUCTION—LB & CA

▲ **SOUTH CAROLINA**—State Hy. Dpt., Hotel Jefferson, Columbia,
McMeekin Constr. Co., P. O. Box 352, Cheraw, S. C., CA **$1,922,733**, bridge work, S. C. Docket No. 7.238.4, F. A. Proj. No. F-2534 (5), Beaufort Co. Bids Aug. 18. CD 8/23, under LB.

SOUTH CAROLINA—State Hy. Dpt., Hotel Jefferson, Columbia,
Peden Constr. Co., Inc., Box 1836, Greenville, S. C. CA **$810,129**, road work, S. C. Docket No. 4.435. F. A. Proj. No. F-2600 (1) Part 2, Anderson Co. Bids Aug. 18. CD 8/24, under LB.
FLORIDA—State Road Dpt., Tallahassee,
Powell Bros. Inc., Box 281, Fort Lauderdale, Fla., CA **$730,673.** maint. traffic, removal of existing structures, embankment, rock base with surf. b. conc., bridge, bridge items, 0.447 mi. State Road 810, Bridge and approaches over Intracoastal Waterway between Kester Blvd. in Deerfield Beach and SR A1A Job 8612-175, Brevard Co. Bids May 31, awarded Sept. 15. CD 6/6, under LB.

▲ **FLORIDA**—State Road Dpt., Tallahassee,
Fla.—**White Constr. Co.**, Box 126, Williston, Fla., CA, **$1,208,938.** heavy excav., stab. roadbed, rock base with b. conc., resurf. existing pavement with b. conc., 177 ft. overpass bridge and wid'n. existing overpass bridge over FEC railroad south of Oak Hill; 180 ft. concrete slab bridge on concrete piling, small drainage structures 13.612 mi. State Road 5 F 003-6 (7), Job 7901-275, Volusia Co.;
Fla.—**Smith Eng. & Constr. Co.**, Drawer 1831, Pensacola, Fla., CA, **$749,502.** heavy excav., sand-clay base, with bit., and sand-clay base with b. conc. storm sewers, curb, gutters, sidewalk, 2 concrete, steel hy. overpass bridges, 145 ft. and 218 ft. underpass bridge at Seaboard Air Line R. R. Crossing 1.77 mi. State Road 20, U 016-2 (13), UG-016-2 (11) and F 016-2 (12), Jobs 5508-204, 5508-301 and 5508-205, Leon Co. Bids Aug. 30, awarded Sept. 16. CD 9/2, under LB.

† **W. T. Price Dredging Corp.**, 3200 S.W. 27 Ave., Miami, Fla., CA, **$794,750.** Levee 20, North New River Canal, Central and Southern Florida Flood Control Proj. CIVENG-08-123-56-3, FLORIDA. U. S. Eng., P.O. Box 4970, Jacksonville, Fla. Bids Aug. 25. CD 7/21.

† **Moss Constr. Co.**, 822 12 St., Columbus, Ga., CA, **$933,547** non-overflow earth dike at Fort Gaines Lock & Dam, Chattahoochee River, CIVENG-01-076-56-1, ALABAMA and GEORGIA. U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Sept. 13. CD 9/20, under LB.

† **McWilliams Dredging Co.**, 903 S. Jefferson Davis Parkway, New Orleans, La. LB **$759,792.** (6 bidders) Blind Tensas Cut and Upper Grand River Channel dredging, involving 5,280,000 cu. yd., St. Martin and Iberville Parishes, Inv. 56-31, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Sept. 15. CD 8/29.

▲† **Guy F. Atkinson Co.**, 10 W. Orange Ave. S., San Francisco, Calif. and **United Constr. Co.**, 64 W. Fifth St., Winona, Minn. CA Est. **$14,603,317.** (jointly). Greenup Locks, KENTUCKY. U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va. Bids Sept. 15, awarded Sept. 16. CD 7/26.

BUILDINGS—LB & CA

▲ **E. H. Scott & Sons**, Box 946, Americus, Ga., LB, **$1,150,260.** Martin Elementary SCHOOL (colored); Helen Gurr Elementary SCHOOL (colored); Dunbar Elementary SCHOOL (colored); Northside Elementary SCHOOL (colored); County Colored High SCHOOL;

(Continued on page 360)

WHO

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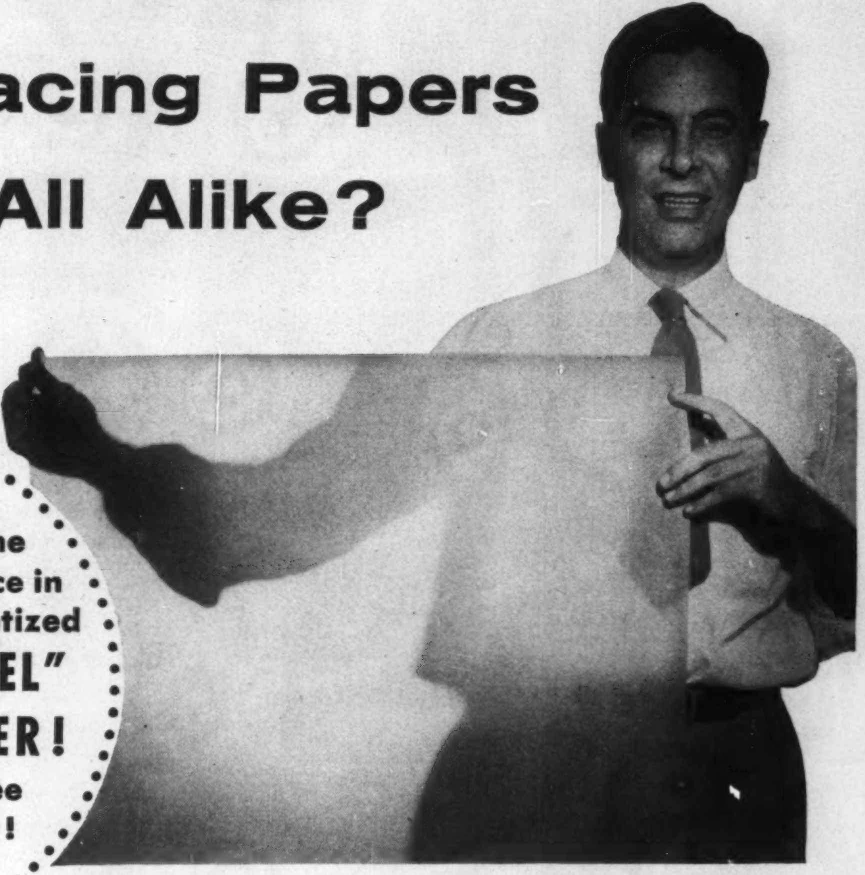

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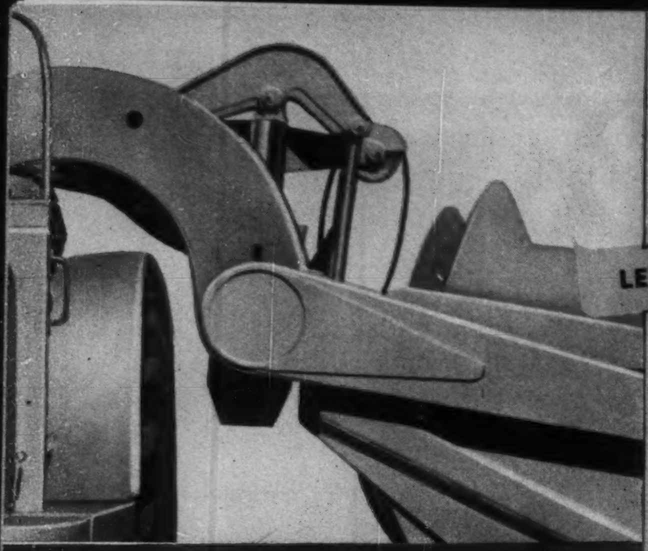
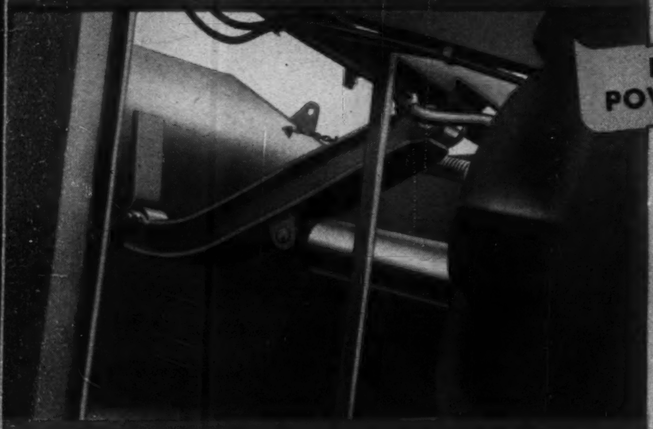


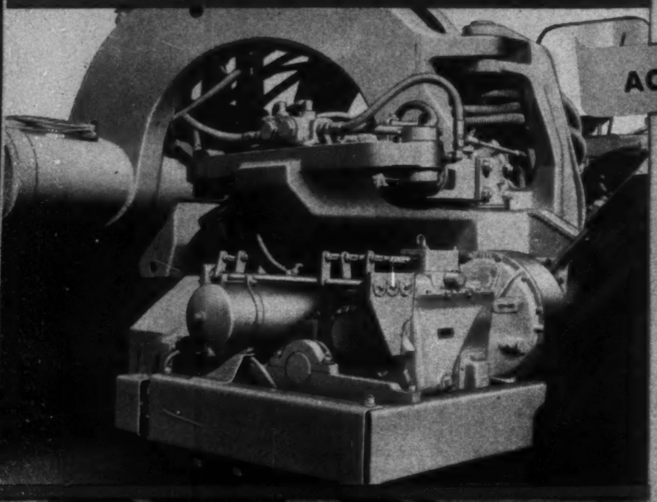
LEVER ACTION

Lever action, an exclusive Euclid feature, does away with cable headaches for good . . . only 12 ft. of cable used for the apron lift. All scraper operations, bowl, apron and ejector, are actuated by levers with independent hydraulic control . . . they're fast and positive . . . not interconnected in any way. All four of the hydraulic jacks are interchangeable . . . one spare fits anywhere!



ROLL-OUT POWER EJECTOR

Roll-out power ejector is independently controlled—dumps capacity loads, even wet, sticky material, fast and clean. Maximum power is available at start of the dumping operation when it is needed most. Cam and roller action speeds up ejector action near the end of the dumping operation. High apron lift permits fast, free ejection of big loads.



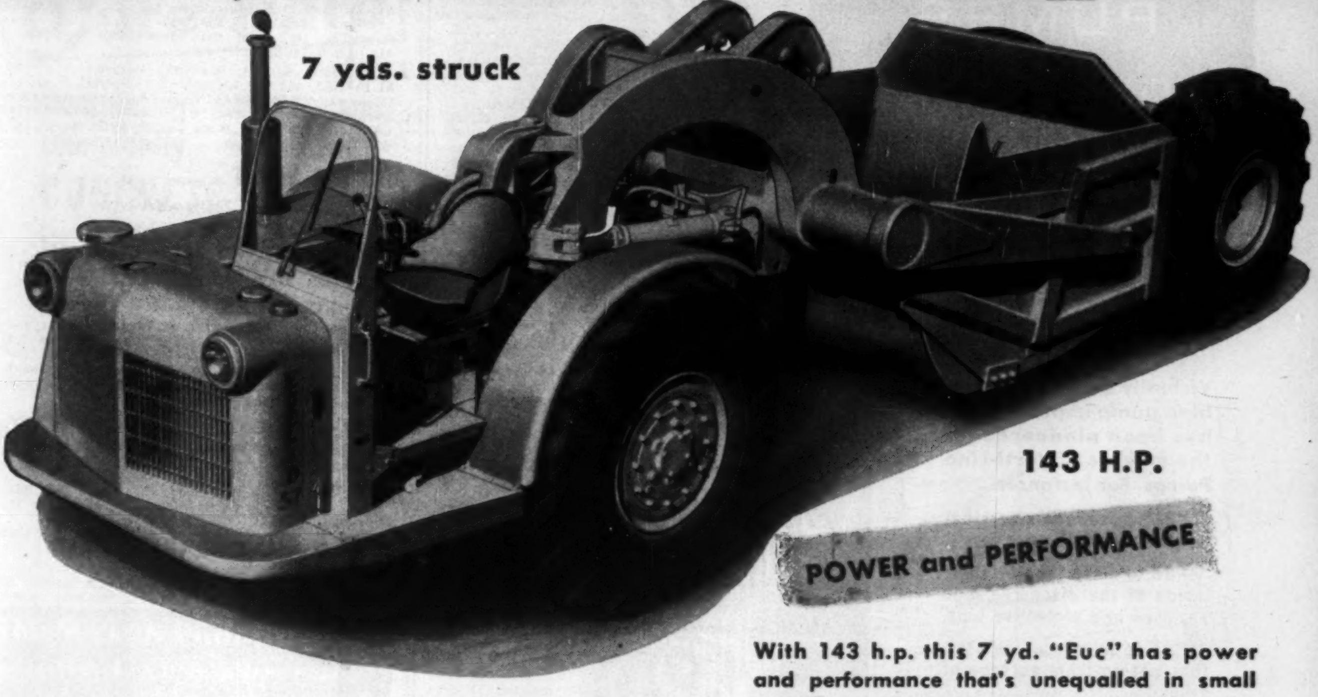
ACCESSIBILITY

Accessibility of major components — engine, clutch, transmission and drive axles—is a time saving, cost cutting feature of the S-7 design. Repairs or replacement do not require a major disassembly job. Removal of components takes about half the time required for other small scrapers. Easy servicing and maintenance keeps down time to a minimum—means more payloads per hour.

FOUR SECTION CUTTING BLADE

A four section cutting blade provides most efficient loading in any material. Each section is reversible and interchangeable to give longer life and permit the straight or drop center blade arrangements best suited for job requirements. A new cutting edge for any blade arrangement can be obtained by simply reversing or interchanging the sections.

S-7 "Euc" Scraper



POWER and PERFORMANCE

With 143 h.p. this 7 yd. "Euc" has power and performance that's unequalled in small scrapers. . . 20 h.p. for every yard of capacity . . . 18.00 x 25 tires . . . and a top speed of 25 m.p.h. with full payload.

This "Euc" S-7 is the newest addition to Euclid's Scraper line—fastest growing line in the industry because of customer acceptance and preference. It incorporates many of the features that have made larger Euclid Scrapers tops in production and efficiency . . . and has greater accessibility than any previous "overhung" scraper on the market.

Built to Euclid's standards of rugged construction for long service life, the S-7 is engineered throughout for good accessibility of all major components, for fast loading and travel, and for ease of operation. The entire power train—engine, clutch, transmission, planetary drive axle, etc.—is easy to get at for servicing, repair or replacement. This is a mighty important cost cutting feature in a single axle prime mover.

Before you buy your next small scraper, check the profit making features of the S-7. Your Euclid dealer can show you how this new "Euc" can get more work done at lower cost than any other scraper of comparable size.

MANEUVERABILITY

Maneuverability—so important for close quarter work—is excellent with the S-7. Full power steering and hitch design of the two-wheel tractor provides a 29 ft. non-stop turning radius. The 18.00 x 25 or 21.00 x 25 (optional) tires have large rolling radius for good traction and flotation.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

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PUMPS
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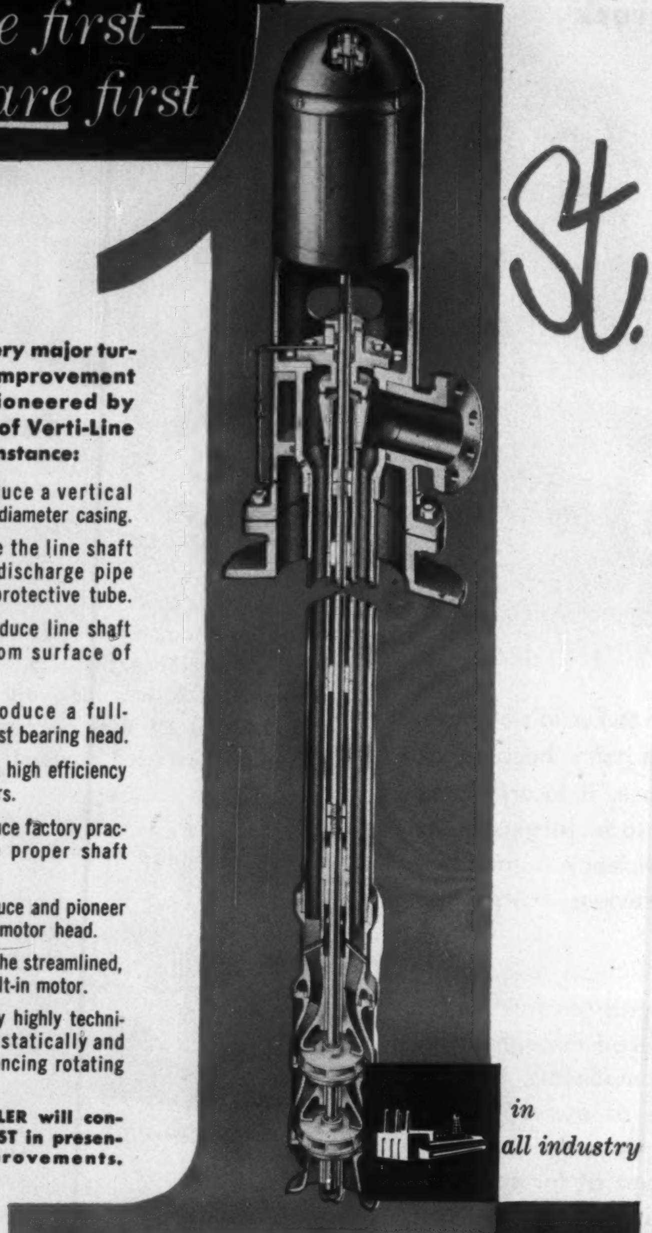

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first to produce a vertical pump for small diameter casing.

first to place the line shaft inside of the discharge pipe enclosed in a protective tube.

first to introduce line shaft lubrication from surface of ground.

first to introduce a full-floating ball thrust bearing head.

first to design high efficiency enclosed impellers.

first to introduce factory practices to insure proper shaft alignment.

first to introduce and pioneer the hollow-shaft motor head.

first to adopt the streamlined, weatherproof, built-in motor.

first to employ highly technical methods for statically and dynamically balancing rotating parts.

LAYNE & BOWLER will continue to be FIRST in presentation of improvements.

More than 100,000 satisfied vertical pump users agree there's no pump like Verti-Line for low first cost, economical operation, and negligible maintenance. Whatever your vertical pump needs may be, it will pay you to investigate Verti-Line before you buy.

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(Continued from page 356)

mechanical alterations to Brownwood Elementary, Graves Elementary, Parrott Elementary and Sasser Elementary SCHOOLS; Dawson Elementary and Terrell High SCHOOL addns., DAWSON, GA. Georgia School Bldg. Auth., 41 Exchange Pl. S. E., Atlanta, Ga. Bids Sept. 20. CD 8/16.

▲ **Adams & Baker and N. C. Morgan Constr. Co.,** First National Bank Bldg., Tuscaloosa, Ala., CA, **$1,175,000.** 150-room HOTEL, TUSCALOOSA, ALA. Tuscaloosa Hotel Co., Inc., First Natl. Bank Bldg., Tuscaloosa, Ala. CD 9/21/53.

▲ **R. J. Jones & Sons,** Box 991, Alexandria, La. LB **$1,167,503,** est. $1,500,000. (12 bidders) 2 story, steel, masonry ENGINEERING BLDG. for Southwestern Louisiana Institute, Proj. E 3 SLJ-1, LAFAYETTE, LA. State Bldg. Auth., State Capitol, Baton Rouge, La. Bids Sept. 13. CD 8/9.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES

October 11, 19 Ohio
October 11, 19 Ohio
October 11 Wisconsin
October 11 Wisconsin

BUILDINGS—BA

▲ **O., Cincinnati**—SHOPPING CENTER—BA 11/1—Walter Crothers, 7911 Reading Rd., (selected list bidders), Brentwood Shopping Center, Winton Rd. and Hempstead Dr. $2,000,000. Cordes, Pressler, Houch & Assoc., 4939 Paddock St., archts. Beineke & Ruehlmann, 626 Broadway, engrs.

BUILDINGS—SLC

O., University Heights—CHURCH—Catholic Diocese of Cleveland, 1027 Superior Ave., Cleveland, Zone 14, soon lets contract Gesu Church, $500,000. John E. Miller, Hanna Bldg., Cleveland, Zone 15, archt. Barber & Magee, 1900 Euclid Bldg., Cleveland, Zone 15, engrs. CD 8/16.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,
Geo W. Lathrop & Sons, 1510 Montcalm St., Toledo, O. LB **$2,279,496,** est. $2,498,000. (7 bidders) constr. 4 mi. Toledo Expressway between Front and the city limits, Lucas Co. Bids Sept. 13. CD 8/25.

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,
O.—**The Great Lakes Constr. Co.,** Box 2278, Brooklyn Station, Cleveland, O. LB **$287,983,** est. $308,100. (5 bidders) Type T-35 and structures 2.03 mi., SR 87-10.55, S-9 (9), Geauga Co.;
O.—**Ohio Engineering Co.,** 105 Sixth St., Lorain, O. LB **$501,797,** est. $518,900. (3 bidders) Type T-35 2.556 mi., SR 254-(2.40-3.38) S 951 (4), U-1094 (1), Lorain Co.;
O.—**Fenton Constr. Co.,** P. O. Box 310, Ashland, O. LB **$86,600,** est. $93,000. (3 bidders) Type T-35 1.939 mi. USR 40-0.00 (14.64-16.04), village of West Jefferson, Franklin and Madison Counties;
O.—**Ohio Valley Paving Corp.,** 34 and Belmont Sts., Bellaire, O. LB **$75,638,** est. $91,400. (2 bidders) Type T-35 4.439 mi. SR 265-(12.27) (14.90), Guernsey Co.;
O.—**Rome Daugherty,** Glenford, O. LB **$80,934,** est. $101,700. (9 bidders) Type T-32 on B-119 and structures 0.464 mi. SR 595-(3.77) (4.70), Hocking Co.;
C.—**Kulka Industrial Corp.,** 826 N. Webb Ave., Alliance, O. LB **$159,987,** est. $163,700. (5 bidders) Type T-170 and structure 0.383 mi. SR 664-15.99, Hocking Co.;
O.—**Tri-State Asphalt Corp.,** South Broadway, Martins Ferry, O. LB **$125,479,** est. $154,400. (1 bidder) Type T-35 on B-20 2.689 mi. SR 7-(29.61-31.47) villages of Empire and Stratton, Jefferson Co.;
O.—**Chapin & Chapin, Inc.,** Norwalk, O. LB **$518,345,** est. $544,400. (2 bidders) Type T-35 and structures 4.66 mi. SR 18-(2.44-6.70), Median Co.;
O.—**L. R. Skelton,** 38 Powhatan Ave., Columbus, O. LB **$1,115,468,** est. $1,178,000 (4 bidders) Type T-35 on B-119 and structure 7.742 mi., USR-22-0.00, 6.83, Muskingum and Perry Counties.;
O.—**V. N. Holderman & Sons, Inc.,** 890 Oakland Park Ave., Columbus, O. LB **$966,611,** est. $1,155,000. (9 bidders) type T-71 and structures 5.835 mi., USR 23-(1.43-3.74), Pickaway Co.;
O.—**Murray Constr. Co.,** P. O. Box 231, Waverly, O. LB **$121,390,** est. $140,500 (4 bidders) Type T-35 and structure 0.74 mi. USR 50-(11.42-11.78) Ross Co.;
O.—**Harper Supply, Inc.,** 118 W. Front St., Napoleon, O. LB **$784,447,** est. $779,800 (6 bidders) Type T-35 on B-20 and structure 4.109 mi., USR 224-10.66, Seneca Co.;
O.—**Ohio Road Paving Co., Inc.,** 30 E. Broad St., Columbus, O. LB **$80,165,** est. $81,800 (1 bidder) Type T-35, 2.786 mi. USR 30-(12.34-12.48), (13.45), USR 62 (18.81-19.01) (19.54-19.80); SR 8-(9.40-9.46) (10.69) city of Canton, Stark Co.;
O.—**Odell Constr. Co.,** Prouty Rd., Painesville, O. LB **$80,808,** est. $81,800 (1 bidder) Type T-35 on B-119, 0.219 mi. SR 91-14.40 village of Hudson, Summit Co.;
O.—**L. P. Cavett Co.,** 511 Shepherd Ave., Lockland, O. LB **$87,170,** est. $91,500 (2 bidders) Type T-35 5.698 mi. USR 42-4.59, Union Co., Bids Sept. 13;
O.—cancelled bids to have been opened Sept. 13 Type T-35 on B-119 and structures 0.378 mi. CR 84 S 396 (2), Allen Co.; Type T-35 and structures 6.878 mi., USR 6-(0.08-1.75) village of Vermilion, village of Vermilion-on-the-lake, Erie and Lorain Counties. CD 8/26.

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▲ **Williams Bros. Co.**, National Bank Tulsa Bldg., Tulsa, Okla. CA **$1,000,000.** Total est. $10,000,000. 1st section of 110 mi. coal transmission pipe line from Cadiz to Eastlake, OHIO. Pittsburgh Consolidation Coal Co., Koppers Bldg., Pittsburgh, Pa. Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., engr. CD 4/28/54.

▲ **INDIANA**—Indiana Toll Road Comn., 309 W. Washington St., Indianapolis, Zone 4,
Union Building & Constr. Corp., 631 Main Ave., Passaic, N. J., LB **$3,319,560.** Contract C-7, grading, drainage, structures, paving approx. 2.12 mi. Contr. Sect. C-7, Indiana-East West Toll Road, beginning at point approx. 3,343 ft. westwardly from center line of Cline Ave. in City of Hammond at Toll Road Station 675 plus 00 and extending eastwardly a distance of about 11,200 ft. to point at Toll Road Station 787 plus 00, said point beginning westwardly about 1,845 ft. from centerline of Durbin St. in City of Gary. Bids Sept. 14. CD 8/22.

WISCONSIN—State Hy. Comn., State Hy. Office Bldg., Madison,
C. R. **Meyer & Sons Co.**, 50 State St., Oshkosh, Wis., CA **$936,461.** Oregon-Jackson St. Bridge and approaches, U.S. Hy. 45, Proj. T 5901 (1), Winnebago Co. Bids Sept. 8. CD 9/13, under LB.

▲ **Dearborn-Melvindale Disposal Auth.**, Dale H. Fillmore, chn., Dpt. Law, City Hall, Dearborn, Mich. cancelled bids to have been opened Sept. 20, refuse incinerator, DEARBORN, MICH. CD 8/9.

BUILDINGS—LB & CA

▲ **H. W. Marcuson Builders**, 5703 Curtis Ave., Cleveland, O. CA Est. **$1,100,000.** 2 story, 74 unit MOTEL, on 150x404 ft. site, 3333 Euclid Ave., CLEVELAND, O. Watson Realty Co., c/o Louis Skolnik, archt., Perry-Payne Bldg., Cleveland 14, O. Awarded Sept. 15.

E. **Elford & Son**, 555 S. Front St., Columbus, O. CA general contract 1 story, steel, concrete, 53,000 sq. ft. PLANT, COLUMBUS, O. Total est. **$500,000.** Borden's Moores & Ross Div., 165 N. Washington Ave., Columbus;
Electrical Contractors, Inc., 1343 Holly Ave., Columbus, O. CA, electrical work (Columbus, O.);
Limbach Co., 1183 Essex Ave., Columbus, O. CA plumbing and heating work (Columbus, O.);
Armstrong Cork Co., 1282 Edgehill Rd., Columbus, O. CA insulation work (Columbus, O.);
York Corp., 2910 Herbert Rd., Columbus, O. CA refrigeration work (Columbus, O.).

▲ **Dwight-Lloyd Div. of McDowell Co., Inc.**, 3203 W. 71 St., Cleveland, O. CA **$20,000,000.** cement PLANT, between Elyria Ave. and Black River running from Eleventh to Sixteenth St., LORAIN, O. Universal Atlas Cement Co., 101 Park Ave., New York, N. Y. CD 7/13.

▲ **Westinghouse Electric Corp.**, P.O. Box 868, Pittsburgh 30, Pa. CA 156,250 kw. TURBO-GENERATOR for Walter C. Beckjord Station, NEW RICHMOND, O. Total est. **$25,000,000.** Cincinnati Gas & Electric Co., P.O. Box 960, Cincinnati 1, O.;
Combustion Engineering, Inc., 200 Madison Ave., New York, N. Y. CA 1,000,000 lb./hr. boiler (New Richmond, O.);
Dravo Corp., Neville Island, Pittsburgh, Pa. CA piers and piling for power house (New Richmond, O.). Substructure and superstructure contracts not awarded. **(Correction**—contractors and size of unit). CD 8/10, under CA.

▲ **Knowlton Constr. Co.**, Bellefontaine, O. CA **$2,034,-870.** general contract HIGH SCHOOL, SANDUSKY, O. Bd. Educ., High School Bldg., Sandusky, O. Bids Sept. 20. CD 8/23.

▲ **Cuyahoga County Hospital**, Court House, Cleveland 13, O. rejected bids Aug. 29, county hospital alterations and addns., with chapel, WARRENSVILLE, O. LB **$1,303,000** general contract. Will re-advertise. CD 9/1, under LB.

Ridgewood Homes, Inc., 6556 W. 14 St., Indianapolis, Ind., Owner Builds. **$400,000.** HOMES, west side of INDIANAPOLIS, IND.

▲ **Hagerman Constr. Co.**, 403 Strauss Bldg., Fort Wayne, Ind. CA Est. **$1,000,000.** 132,000 sq. ft. FACTORY, LIGONIER, IND. Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland, O. **(Correction**—contractor). CD 8/31, under CA.

Arthur Vander May Realty Co., 10719 S. Western St., Chicago, Ill. Own Forces. **$607,000.** 40 HOMES, THORNTON, ILL.

Theo. Molzahn & Sons, Inc., 1812 Madison St., La Crosse, Wis., CA Est. **$500,000.** 1 story, 122x440 ft. concrete, steel, brick, block PLANT addn., LA CROSSE, WIS. Trane Co., 206 Cameron Ave., La Crosse, Wis. CD 8/24.

▲ **Selzer-Ornst Co.**, 6222 W. State St., Wauwatosa 13, Wis., CA Est. **$1,000,000** general contract 4 story, 110x240 ft. OFFICE, MILWAUKEE, WIS. Associated Hospital Services, 826 N. Plankington St., Milwaukee, Wis. Bids Sept. 7. CD 8/17.

▲ **Frankel Brothers**, Huntington Woods, Mich. Owner Builds. **$2,000,000.** Franklin Woods SUBDIVISION, 90 acre site Franklin between 14 and 15 Mile Rds., BERKLEY, MICH.

▲ **Edward Rose & Sons**, 14900 Linwood St., Detroit, Mich. Owner Builds. **$2,200,000.** Lahser Meadows Subdivision, 189 brick HOMES, Lahser and Eight Mile Rds., DETROIT, MICH.

▲ **Mount Clemens Constr. Co.**, 27225 Hickler Lane, Mount Clemens, Mich. CA Est. **$1,220,000.** Hall Heights Development, 100 brick HOMES, Gratiot and Hall Rds., MOUNT CLEMENS, MICH. Rose-Hill Co., 14601 E. Seven Mile Rd., Detroit, Mich.

▲ **Wiseman & Turo Constr. Co.**, 28201 Bell St., Southfield, Mich. Owner Builds. **$2,500,000.** River Crest

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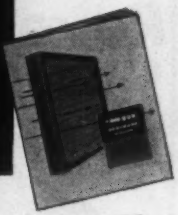

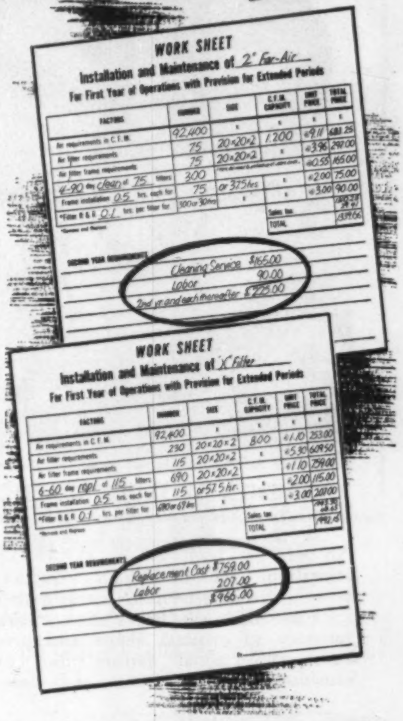

WORK SHEET
Installation and Maintenance of 2" Far-Air
For First Year of Operations with Provision for Extended Periods

FACTORS	NUMBER	SIZE	C.F.M. CAPACITY	UNIT PRICE	TOTAL PRICE
Air requirements in C.F.M.	92,400				
Air filter requirements	75	20×20×2	1,200	@9.11	683.25
Air filter frame requirements	75	20×20×2		@3.96	297.00
4-90 day clean of 75 filters	300			@0.55	165.00
Frame installation 0.5 hrs. each for	75	or 37.5 hrs		@2.00	75.00
*Filter R & R 0.1 hrs. per filter for	300 or 30 hrs			@3.00	90.00
					1310.25
			Sales tax		29.41
			TOTAL		1339.66

*Remove and Replace

SECOND YEAR REQUIREMENTS
Cleaning Service $165.00
Labor 90.00
2nd yr. and each thereafter $255.00

WORK SHEET
Installation and Maintenance of "X" Filter
For First Year of Operations with Provision for Extended Periods

FACTORS	NUMBER	SIZE	C.F.M. CAPACITY	UNIT PRICE	TOTAL PRICE
Air requirements in C.F.M.	92,400				
Air filter requirements	230	20×20×2	800	@1.10	253.00
Air filter frame requirements	115	20×20×2		@5.30	609.50
6-60 day repl. of 115 filters	690	20×20×2		@1.10	759.00
Frame installation 0.5 hrs. each for	115	or 57.5 hr.		@2.00	115.00
*Filter R & R 0.1 hrs. per filter for	690 or 69 hrs			@3.00	207.00
					1943.50
			Sales tax		48.65
			TOTAL		1992.15

*Remove and Replace

SECOND YEAR REQUIREMENTS
Replacement Cost $759.00
Labor 207.00
$966.00

Because most filters are efficient at cleaning air, you are reasonably sure of getting a satisfactory job when you install an established make. The service life of your expensive air conditioning machinery and the comfort of your building depend on the ability of relatively low cost filters to do their job.

FARR Company, as one of the country's leading filter manufacturers, wants to insure that you are getting the most value out of your present filters, regardless of make. Therefore, they will send a field engineer who is an air filtration expert, to carefully analyze your air filters and submit a factual, written report like the one shown, on his findings. Often he can make suggestions that will greatly increase your filtration efficiency and save you a substantial amount of money in operating costs.

FARR Company is making this service available to you on a no cost basis because it will increase your appreciation for the function of the often-neglected air filters. It will point out the importance of buying standard brand filters. It will in some cases result in sales for FAR-AIR filters . . . and that is important, too.

Why not try this service? It is factual, honest and subject to favorable comparison by any reputable manufacturer. Write today to Farr Company, P. O. Box 45187, Airport Station, Los Angeles 45, California.

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COMPANY
NO COMPROMISE ON QUALITY
Los Angeles, New York, Chicago
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NO CRUSH DAMAGE

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. . . because it's
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No wire is used in the carcass of Hamilton REVELATION Suction Hose. Specially-treated, hard-twisted cord and multi-ply heavy duck insure recovery to original shape and prevent conventional failure due to crushing abuse. Weather and wear-resistant corrugated cover over the multi-ply carcass provides a smooth-bore suction hose for mining or construction work in six popular sizes from 1" to 3" I.D. Ask your Jobber for details, or send for our literature.

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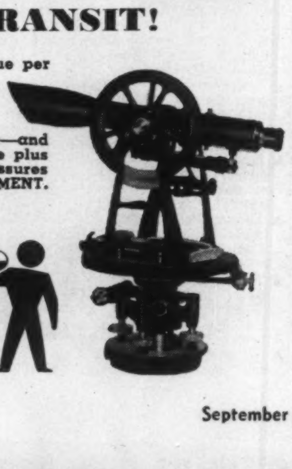


Development, 43 brick ranch HOUSES, Bittersweet Lane between 11 and 12 Mile Rds., SOUTHFIELD, MICH.

WEST OF MISSISSIPPI

BUILDINGS—BA

Tex., Galena Park—SCHOOLS—BA 10/10—Galena Park Independent School Dist., Galena Park, Cloverlief Junior High School and Elementary School in Fidelity Manor subdivision. $800,000. Plans deposit $150. H. Voelcher & Assocs. 1202 Dennis St., Houston, archts. CD 4/29/54.

▲ **Minn., St. Paul**—PLANT—BA 10/11—Engineering Research Associates of St. Paul, Div. of Remington Rand, 543 St. Peter St., 1 story, 200,000 sq. ft. electronics plant between W. 7 St. and Davern St., Norfolk Ave. and Mississippi River, $2,000,000. Ellerbe & Co., E. 505 First National Bank Bldg., engrs. CD 6/15.

▲ **Tex., El Paso**—Y. M. C. A. BUILDING—BA 10/11—Young Men's Christian Assn., 530 N. Oregon St., Central Y. M. C. A. bldg. $1,500,000. Plans deposit $75. Monroe, Licht & Higgins, 827 Yandell Blvd., archts. and engrs. Blum & Guerrero, 4930 Maple St., Dallas, engrs. CD 9/19.

Mo., Ferguson-Florissant—SCHOOL, etc.—BA 10/15—Ferguson-Florissant school Dist. R-2, Bd. Educ., Virgil C. McClure, supt. Schools, 200 Church St., Ferguson, 1 and 2 story Junior High School, 60x155 ft. bus garage, Hy. 66 between Old and New Florissant Rds., Florissant; 2 story, bsmnt. administration bldg., January and Day Aves., Ferguson. $610,000. Charles W. Lorenz, 700 N. Ballas Rd., Rte. 13, Box 1378, Kirkwood, Zone 22, archt.

▲ **Neb., Lincoln**—HIGH SCHOOL—BA 10/19—Chancery Office, 514 S. 18 St., St. Pius X High School. $1,000,000. Fritz Craig & Jack Beers, 724 1st Natl. Bank Bldg., archts. CD 4/21.

Tex., Andrews—SCHOOL—BA 10/25—Andrews Independent School Dist., Andrews, elementary school and appurtenant rooms. $511,000. Plans deposit $25. Caudill, Rowlett, Scott & Assocs., Bryan, archts. A. M. Martin & J. W. Hall, Jr., Bryan, engrs. CD 8/18.

▲ **Tex., Houston**—HIGH SCHOOL—BA 11/3—Houston Independent School Dist., 1300 Capitol St., Kashmere Gardens Junior High School. $1,250,000. Plans deposit $50. Wirtz, Calhoun, Tungate & Jackson, 2506 Richton Dr. archts. CD 9/14/54.

BUILDINGS—SLC

▲ **Iowa, Iowa City**—PLANT—Procter & Gamble Mfg. Co., Gwynne Bldg., Cincinnati, O., soon lets contract drug products plant. Over $1,000,000. A. N. Kinney, Inc., 2905 Vernon Pl., Cincinnati, O., archt. CD 4/13.

Tex., Austin—CLASSROOMS, etc.—Episcopal Theological Seminary of Southwest, 32nd and Duval Sts., soon lets contract, approx. 37,000 sq. ft. masonry classrooms-library-administration bldg. units. $400,000. Fehr & Granger, 502 E. 5th St., Dallas, archts. Wilson & Cottingham, Brown Bldg., and Blum & Guerrero, 4930 Maple St., Dallas, engrs. CD 9/14.

HEAVY CONSTRUCTION—LB & CA

▲ **Western-Knapp Eng. Co.**, Hibbing, Minn. CA, **$850,265.** general contract water treatment plant, ST. CLOUD, MINN. City, A. J. Haberkorn, clk.-treas., St. Cloud, Minn., CD 8/30, under LB;
G. A. Bass Constr. Co., Birmingham, Mich. CA **$615,201.** major equip. and process piping. (St. Cloud, Minn.). CD 9/1, under LB.

Stimson Corp., Box 5302, Dallas, Tex., LB **$405,604**, est. $1,000,000. c.i. water lines, incl. pipe, 54,000 lin. ft. 20 in.; 22,000 lin. ft. 24 in., incl. appurtenances, from Wylie to McKinney, DALLAS, TEX. North Texas Municipal Water Dist., H. B. Bisby, Wylie, Tex. Forrest & Cotton, 83 Praetorian Bldg., Dallas, Tex., engrs. Bids Sept. 13. CD 10/23/53.

▲ **Steenberg Constr. Co.**, 1371 Marshall Ave., St. Paul, Minn. LB **$1,448,000.** (6 bidders). exten. water treatment plant, ST. PAUL, MINN. City, L. E. Kinvig, city purch. agt., 253 City Hall, St. Paul, Minn. Bids Sept. 20. CD 9/15.

† **Patton-Tully Transportation Co.**, 1242 N. 2nd St., Memphis, Tenn., LB **$586,906**, constr., repair standard dikes and revetment, Missouri River, Middle Omaha Mission-Monona Bends, near Whiting, Inv. 25-066-56-23, IOWA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 14. CD 9/8.

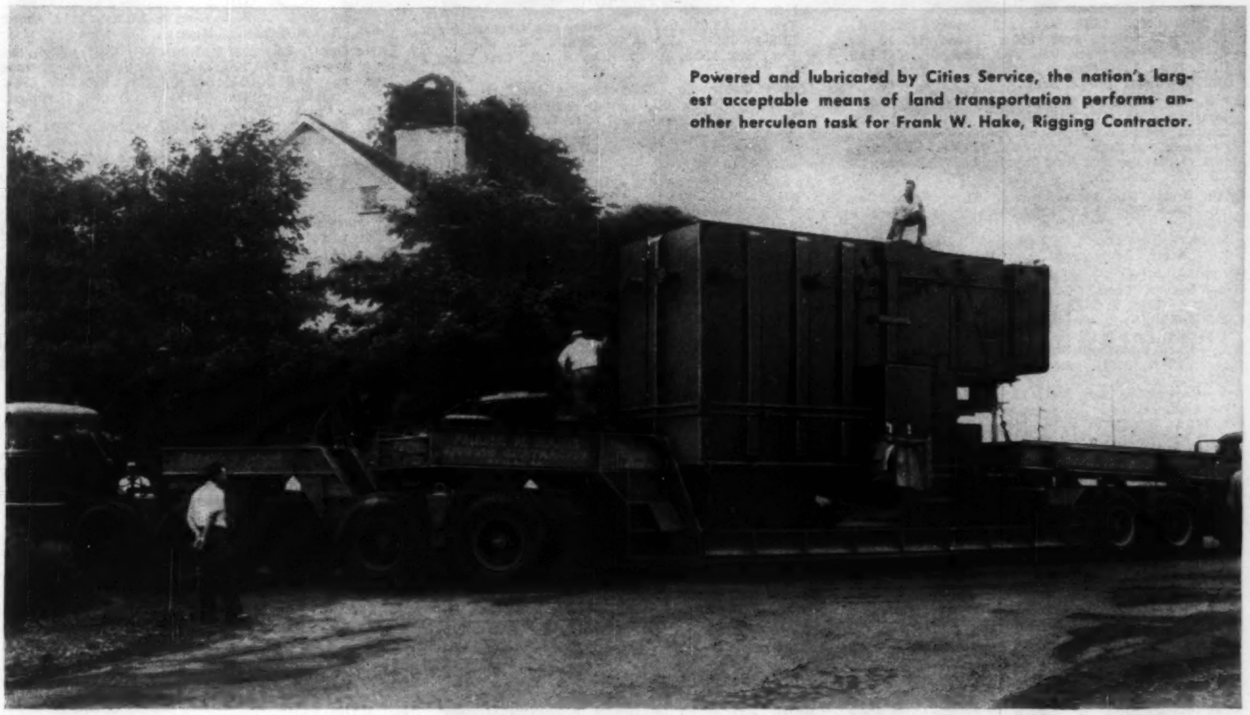
† **E. A. Kramme Co., Inc.**, 5770 2 Ave., Des Moines, Iowa, CA, **$990,859.** bridges, pavement, railroad track at Coralville Reservoir Proj. Inv. 11-117-56-4, IOWA. U. S. Eng., Clock Tower Bldg., Rock Island, Ill. Bids Aug. 30. CD 9/8, under LB.

† **Patton-Tully Transportation Co.**, 1242 N. 2 St., Memphis, Tenn., CA, **$586,906.** repairs, constr. standard dikes and revetment Missouri River Lower Monona-Omaha Mission Bends, Inv. 25-066-56-23, near Whiting, IOWA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 14. CD 9/21, under LB.

† **Farnsworth & Chambers, Inc.**, P.O. Box 74, Houston, Tex., LB, **$737,407**, est. $772,380, ordnance storage, igloos and buildings, Little Rock Air Force Base, ENG-03-050-56-4, JACKSONVILLE, ARK. U. S. Eng., P.O. Box 867, Little Rock, Ark. Bids Sept. 14.

† **SOUTH DAKOTA**—Bureau P. Rds., Dpt. Commerce, Bldg. 40, Denver Federal Center, Denver, Colo.
Peter Kiewit Sons Co., 245 Fort Rd., Box 875, Sheridan, Wyo., LB **$480,884**, est. $75,000, base, bit. surf. 12.331 mi. Cedar Pass-Pinnacles, Proj. 1-A, B (Port) Jackson and Pennington Counties. Bids Sept. 15. CD 9/9.

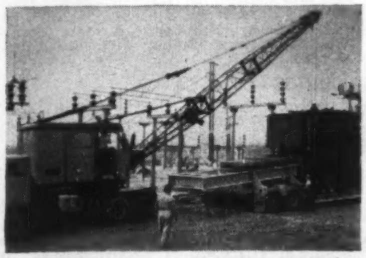
(Continued on page 364)



Powered and lubricated by Cities Service, the nation's largest acceptable means of land transportation performs another herculean task for Frank W. Hake, Rigging Contractor.

A MOVING EVENT: 241 TONS OVER SECONDARY ROADS!

"Our Best Move Was To Cities Service," says Partner Glenn Hake. "It's been paying off for eight years with less down-time, less oil consumption, greater period between overhaul. I heartily recommend Cities Service products for any rigging operation."



More Craning, Less Straining is another benefit enjoyed by the Frank W. Hake firm, using Cities Service products. Trucks, tractors, trailers, hoisting engines — all 36 pieces of mechanized equipment get Cities Service care.

Carrying a 91-ton transformer over secondary roads is just routine work for this mammoth rigging unit of the Frank W. Hake rigging firm, Philadelphia, Pa.

The nation's largest acceptable means of land transportation, the unit measures over 106 feet long, 12 feet wide, 17½ feet high and weighs 150 tons just by itself!

All told, that's 241 tons on the move, thanks to the power and lubrication of Cities Service petroleum products!

Why Cities Service? Partner Glenn F. Hake puts it this way: "When you work with the biggest piece of equipment, you've got to choose the petroleum products that do the biggest job . . . and that's Cities Service. For the past eight years, we've used Cities Service gasolene, diesel fuel, lubricants, and solvents — in *all* our transportation and construction equipment . . . trucks, tractors, trailers, truck cranes, hoisting engines, air compressors, and other equipment too numerous to mention. In fact, we even use Cities Service Fuel Oils to heat our business properties and our homes.

"We can truthfully state, without reservation, that we have had excellent service and performance at all times, and would heartily recommend Cities Service products to others."

If you're interested in Mr. Hake's suggestion, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

(Continued from page 362)

▲† **Tecon Corp.**, 1201 Main St., Dallas, Tex. LB **$3,673,155.** outlet work, Stage II and No. 13 Hy. By-Pass, Tuttle Creek Dam and Reservoir, KANSAS. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. Bids Sept. 20. CD 8/25.

▲† **R. B. Potashnick Constr. Co.**, Box 423, Cape Girardeau, Mo., CA **$5,758,287**, est. $5,000,000. constr., complete Ferrells Bridge Dam and appurtenances Cypress Creek, Marion Co., TEXAS. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Aug. 19. CD 8/23, under LB.

Austin Bridge Co., 1000 Singleton Blvd., Dallas, Tex. LB **$409,635**, est. $380,000. grade separation Mulberry St., SHERMAN, TEX. City, c/o mayor, Sherman, Tex. Freese & Nichols, 407 Danciger Bldg., Fort Worth, Tex., engrs. Bids Sept. 16.

WYOMING—State Hy. Comn., Cheyenne,

Wyo.—**Summit Constr. Co.**, 728 St. Anne St., Rapid City, S. D., LB **$422,401.** base, sand-gravel seal 1 M.P.C.MP, 2 rein.-con. culverts, 7.136 mi. Manville-Lusk Rd., Proj. F-170 (6) Unit 1, Niobrara Co.;

Wyo.—rejected bids Sept. 15, sand-gravel seal one rein.-con. culvert, 3.142 mi. Glendo-Wheatland Rd. F-165 (5), Platte Co.;

Wyo.—received no bids Sept. 15, grading, draining, pit run base, cattleguards and misc. work 4.527 mi. Kendall Rd., Sublette Co. CD 9/7.

▲† **C. H. Leavell Co.**, 1900 Wyoming St., El Paso, Tex. LB **$3,068,547.** laboratory and technical bldgs., ENG-29-005-56-17, ALAMOGORDO, N. M. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Sept. 6. CD 8/10.

Madsen Constr. Co., 2110 Nicollet Ave., Minneapolis, Minn. CA **$905,700.** general contract JUNIOR HIGH SCHOOL, ROSEVILLE (P.O. ST. PAUL), MINN. Bd. Educ., Independent School Dist. No. 3, Ramsey Co., T. C. Schultz, clk., Roseville, Minn. CD 9/8, under LB.

J. Leck Co., 211 S. 11 St., Minneapolis, Minn. CA **$600,000.** general contract 1 story, 90x306 ft., OFFICE, Como Ave. and Eustis St., ST. PAUL, MINN. Group Health Mutual, Inc., G. W. Jacobson, secy., 180 N. Snelling Ave., St. Paul, Minn. CD 6/8.

▲ **Haren & Laughlin Constr. Co.**, 953 Minnesota St., Kansas City, Kan. CA general contract 1 story, 323x459 ft. WAREHOUSE, U. S. Hy. 71 and Bellefontaine St., KANSAS CITY, MO. Total est. **$1,500,000.** Avon Products Co., 1535 Walnut St., Kansas City, Mo. Bids Sept. 2, CD 8/25;
U. S. Eng. Co., 914 Campbell St., Kansas City, Mo. CA plumbing and heating work (Kansas City, Mo.);
Air Contractors, Inc., 1922 Grand St., Kansas City, Mo. CA air-conditioning work. (Kansas City, Mo.).

L. E. Oslie & Co., Inc., 804 N. 12 St., Fargo, N. D., CA Est. **$750,000.** North Port SHOPPING CENTER, FARGO, N. D. J. P. Melberg & Assocs., 3717 Abbott Ave. N., Minneapolis, Minn.

Estrin Constr. Co., 828 E. Ninth St., Kansas City, Mo. CA Approx. **$750,000.** structural part only 177,000 sq. ft. WAREHOUSE and OFFICE, KANSAS CITY, KAN. Jack Merriman & W. W. Zimmer, Commerce Bldg., Kansas City, Kan. Wm. F. Fullerton, 15 W. 10 St., Kansas City, Mo., and Earl McCamis, 1804 Swift St., Kansas City, Mo., archts. B. F. Goodrich Co., 621 E. 14 Ave., Kansas City, Mo., lessee.

Anderson Constr. Co., 445 14 St., Beaumont, Tex. Owner Builds. **$400,000.** 20 DWELLINGS, BEAUMONT, TEX. CD 5/24.

▲† **Stearns-Roger Mfg. Co.**, 660 Bannock St., Denver, Colo., CA Est. **$4,000,000.** design and construct, HELIUM PLANT, EXELL, TEX. Bureau Mines, Dpt. Interior, Box 911, Amarillo, Tex. CD 9/2.

Texas Gulf Building Corp., 7525 S. Park St., Houston, Tex. Owner Builds. **$395,500.** 45 DWELLINGS; **$351,000.** 38 DWELLINGS, HOUSTON, TEX. CD 6/20.

Eitze-Kitchens Constr. Co., Box 3116, Austin, Tex., CA **$644,000**, est. $800,000. group of WARD BLDGS., MEXIA, TEX. Bd. for Texas State Hospitals & Special Schools, 45 and Lamar Sts., Austin, Tex. Bids Sept. 8. CD 9/15 under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 13, 25 California
STREETS AND ROADS
October 12, 19, 20 California

Calif., San Luis Obispo—BA 10/19—State Div. Architecture, P. Wks. Bldg., Sacramento, site development and clearance and relocation for engineering bldg., State Polytechnic College. $400,000. Plans deposit $50. Extended date. CD 8/30.

BUILDINGS—BA

Calif., Whittier—SCHOOLS—BA 10/19—Whittier Union High School Dist., 610 W. Philadelphia St., reinforced brick El Rancho High School addns. $360,000. Plans deposit $50, CD 10/4/54; reinforced brick California High School addns., $402,000, Plans deposit $50. Wm. H. Harrison, 816 W. 5 St., Los Angeles, archt.

Calif., Whittier—SCHOOL—BA 10/26—Whittier Union High School Dist., 610 Philadelphia St., reinforced brick Santa Fe. High School buildings, Santa Fe Springs, $783,000. Plans deposit $50. Wm. H. Harrison, 816 W. 5 St., Los Angeles, archt.

BUILDINGS—SLC

▲ **Calif., Palo Alto**—DORMITORIES—Bd. Regents of Stanford University, Palo Alto, soon lets contract 7 girl's dormitories. $1,000,000. Milton T. Pfleuger, 580 Market St., San Francisco, archt. CD 5/3.

BUILDINGS—LB & CA

▲† **Guy F. Atkinson Co.**, 10 W. Orange Ave. S., South San Francisco, Calif. and **Ostrander Constr. Co.**, Terminal Sales Bldg., Portland, Ore., LB **$4,338,085**, or with credit for salvage of materials, **$4,319,085** (6 bidders), closure dam and removal of cofferdam, The Dalles Dam, Wasco Co., CIVENG-35-026-56-1, OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Sept. 20. CD 9/15.

▲† **Guy F. Atkinson**, Box 259, Long Beach, Calif., LB **$1,232,077**, Los Angeles River Imprv., River Mile 4.97 to 4.63, Long Beach, Los Angeles Co., CIVENG-40-353-56-8, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 8/22.

▲† **Price-McNemmar Co.**, Box 544, Sepulveda, Calif., LB **$1,042,082**, tactical and administrative facilities, Special AAA sites, ENG-04-353-56-1, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 9/1.

▲† **Guy F. Atkinson**, Box 259, Long Beach, Calif., LB **$1,232,077**, Los Angeles River Imprv., River Mile 4.97 to 4.63, Long Beach, Los Angeles Co., CIVENG-40-353-56-8, CALIFORNIA. U. S. Eng., 751 Figueroa St., Los Angeles, Calif. Bids Sept. 20. CD 8/22.

▲ **Eaton & Smith, Constr. Co.**, 1215 Michigan St., San Francisco 7, Calif., LB, **$4,178,888** (4 bidders) earthwork, embankment, on Nacimento River and dam vicinity, 9 mi. southwest of Bradley, SALINAS, CALIF. Monterey County Flood Control & Water Conservation Dist., Court House, Salinas, Calif. Bids Sept. 19. CD 8/22.

BUILDINGS—LB & CA

Garf, Ryberg & Garf, 850 W. 15th N., Salt Lake City, Utah, LB **$757,000**, general constr. 8 story Beneficial Life BUSINESS BLDG., SALT LAKE CITY, UTAH. Zion Security Corp., Union Pacific Annex Bldg., Salt Lake City, Utah. Bids Sept. 2. CD 8/26.

Guthrie Constr. Co., 10703 Renton Ave., Seattle, Wash. Own Forces, **$906,000**, 60 HOMES (first unit) of Evergreen Hills Addition, SEATTLE, WASH. CD 9/22.

▲† **George A. Fuller Co.**, 3100 W. 8 St., Los Angeles, Calif., LB, **$1,230,400** (7 bidders) buildings, structures, Phase 2, Coca Area, Santa Suzana, for Atomic Energy Comn., Wash., D. C., CALIFORNIA. North American Aviation, Inc., 12241 Lakewood Blvd., Downey, Calif. Bids Sept. 19. CD 9/16.

▲ **E. I. du Pont de Nemours & Co.**, du Pont Bldg., Wilmington, Del., Own Forces, **$5,000,000.** design and construct PLANT addns. for Electrochemicals Dpt.

(Continued on page 368)

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LOW COST PORTABLE HEAT

saves time and money for contractors

For only a few cents an hour in fuel, you can dry plaster, fast, even on cold or humid days; pour and cure concrete safely at any temperature and keep men working, inside or out, in freezing weather. That saves hours of time . . . and time means money.

Your Master Heater rolls into place, starts at the flip of a switch. You don't need a vent. Three models put out 100,000; 160,000 or 400,000 BTU's per hour; burn inexpensive kerosene or fuel oil.

The low price is repaid time after time in hours saved and workmen working.

Write for full information or see your Master distributor.

MASTER VIBRATOR COMPANY
342 Stanley Ave., Dayton 1, Ohio

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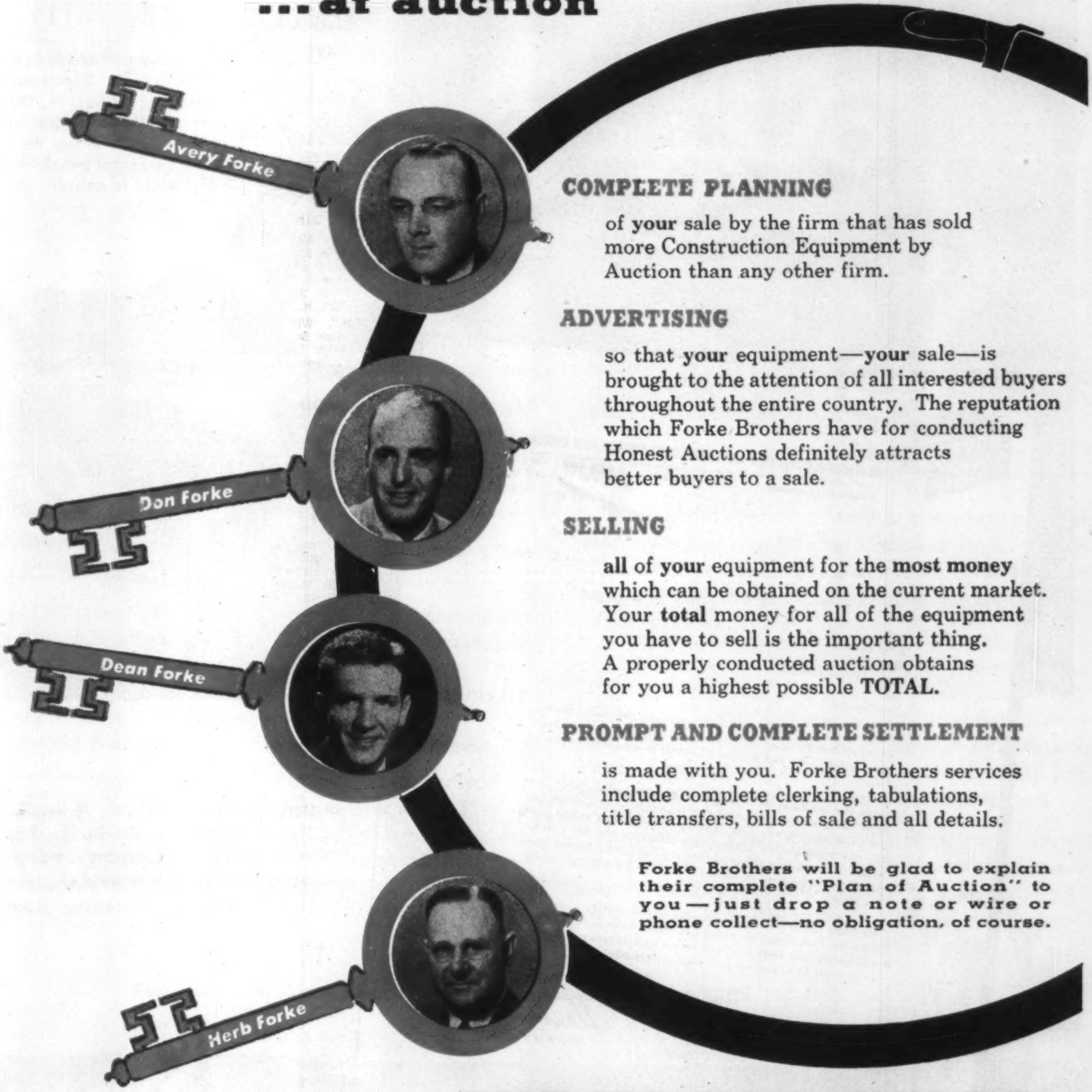

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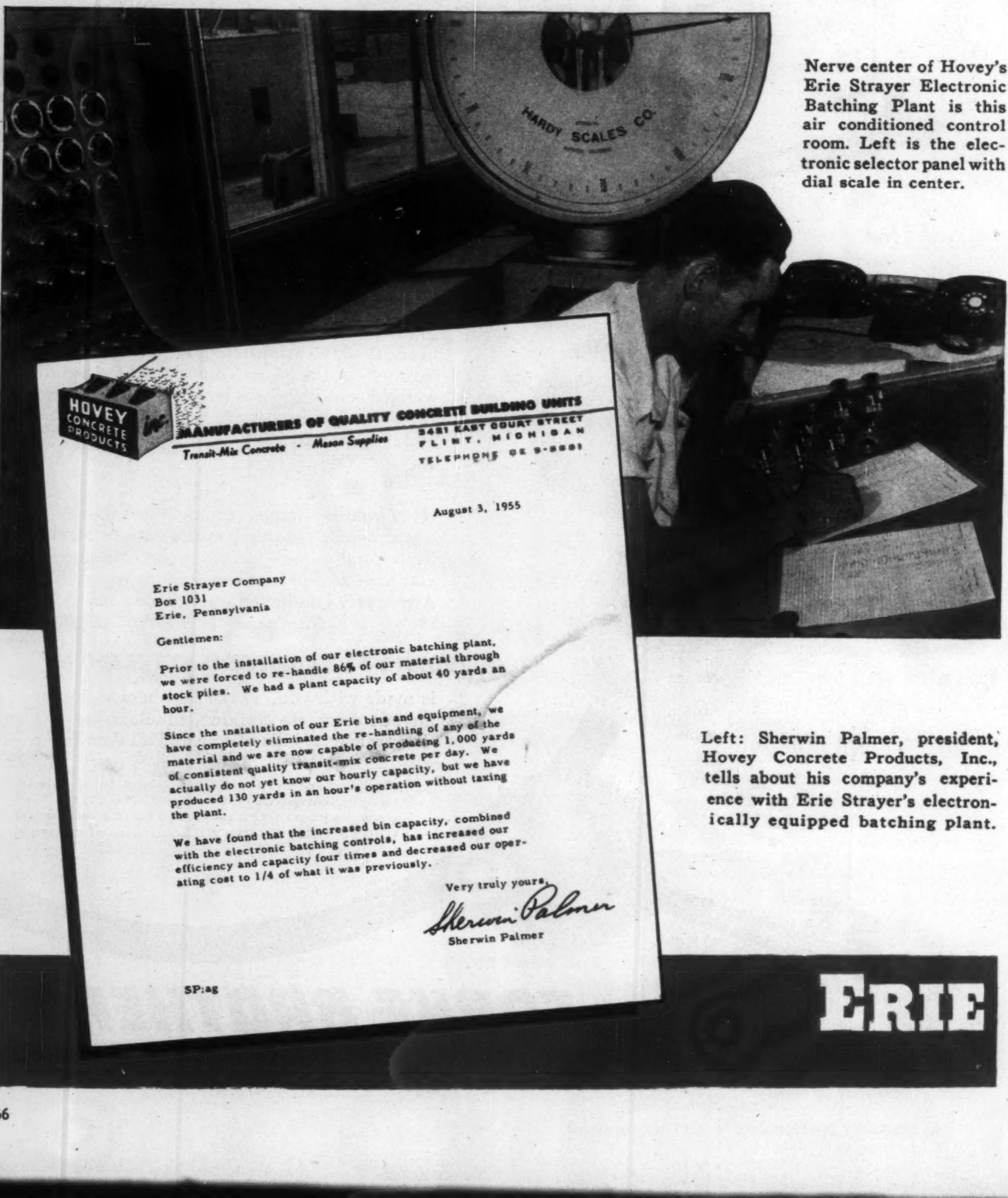
ERIE STRAYER
ELECTRONIC
TRIPLES PRODUCTION AT



Nerve center of Hovey's Erie Strayer Electronic Batching Plant is this air conditioned control room. Left is the electronic selector panel with dial scale in center.

HOVEY CONCRETE PRODUCTS inc.
MANUFACTURERS OF QUALITY CONCRETE BUILDING UNITS
Transit-Mix Concrete - Mason Supplies
3421 EAST COURT STREET
FLINT, MICHIGAN
TELEPHONE CE 9-[illegible]

August 3, 1955

Erie Strayer Company
Box 1031
Erie, Pennsylvania

Gentlemen:

Prior to the installation of our electronic batching plant, we were forced to re-handle 86% of our material through stock piles. We had a plant capacity of about 40 yards an hour.

Since the installation of our Erie bins and equipment, we have completely eliminated the re-handling of any of the material and we are now capable of producing 1,000 yards of consistent quality transit-mix concrete per day. We actually do not yet know our hourly capacity, but we have produced 130 yards in an hour's operation without taxing the plant.

We have found that the increased bin capacity, combined with the electronic batching controls, has increased our efficiency and capacity four times and decreased our operating cost to 1/4 of what it was previously.

Very truly yours,

Sherwin Palmer
Sherwin Palmer

SP:ag

Left: Sherwin Palmer, president, Hovey Concrete Products, Inc., tells about his company's experience with Erie Strayer's electronically equipped batching plant.

ERIE

BATCHING PLANT
HOVEY CONCRETE PRODUCTS

FLINT MICH. FIRM NOW ENJOYS THESE COST-CUTTING ADVANTAGES

1. **Output Up from 40 YPH to 130 YPH**
2. **Materials Handling Cost Cut 75%**
3. **It's Still a One-Man Operation**

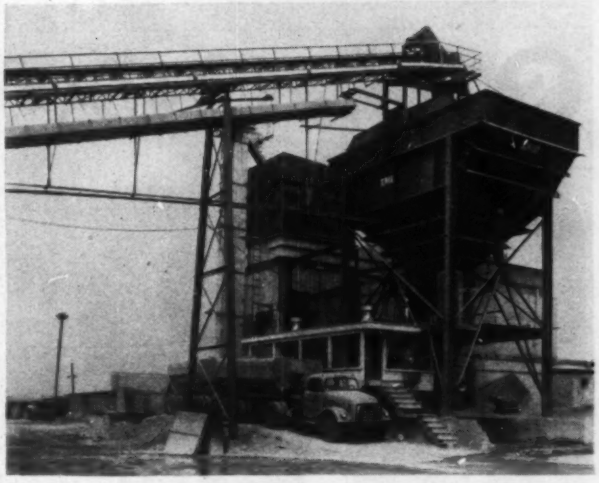
Hovey, Inc. are volume producers of transit-mix concrete and concrete building units. Their customers demand fast service on specification concrete.

Early this year, Sherwin Palmer, president, bought an Erie Strayer Plant equipped with electronic controls for pre-set batching. At the touch of a button the operator can have any one of 5 different batches. All specifications are well within turnpike tolerances.

Mr. Palmer's letter, left, tells how this new plant has greatly increased production and cut costs.

You, too, can enjoy these important benefits. An Erie Strayer plant with electronic controls gives you complete control over your entire batching day. When your operator reports, he simply sets the controls for the batches he will need that day. From then on he merely pushes buttons. Electronics does the rest.

Electronic selectors can be installed to provide as many different pre-set batches as you need. Five—as in the Hovey plant—or any number to suit your requirement. And always, a flick of the switch puts you on pushbutton operation whenever a single special batch is needed.



General view of Hovey Concrete Products, Inc., Flint, Michigan. Plant was sold by Contractors Machinery Co., Detroit.

What about operating costs? It takes just one man to operate any Erie Strayer Plant—electronic or mechanical. Less current than that used by a 100-watt bulb operates the electronic control system. Maintenance is normally negligible.

And the electronically controlled plant has the same money-saving features that have made Erie mechanical plants famous: Quick, economical erection; Free flow of materials from bins to batchers; Faster batching and discharging cycle; Built to last but with all standard parts for easy replacement.

An Erie Strayer Plant with electronic controls soon pays for itself. Add up all its features, then ask yourself if you can afford not to "Go Erie—Go Electronic"!

For Literature Write Dept. E95, Cable Address: EXIMPORT

ERIE STRAYER

BINS THE WORLD OVER

STRAYER COMPANY

295 GEIST RD. ERIE, PENNSYLVANIA

(Continued from page 360)

to mfg. sodium ethyl chloride, trichlorethylene and perchlorethylene, ANTIOCH, CALIF.

Ashby & Opperman, Box 127, Bakersfield, Calif., CA **$558,855**, est. $455,000, AUDITORIUM and MUSIC BLDG., Shafter High School, Shafter, BAKERSFIELD, CALIF. Kern County Union High School Dist., 312 Bernard St., Bakersfield, Calif. Bids Sept. 12. CD 8/26.

Mortex Constr. Co., 7700 Sunset Blvd., Los Angeles, Calif., Owner Builds, **$884,700**. 80 frame, stucco DWELLINGS, Lyndora, Fairfield, Crossdale and Berson Sts., BELLFLOWER, CALIF. Hudson & Brockow, 2824 W. Olympic Blvd., Los Angeles, archts.

▲ **Concord Park Corp. & Collins Constr. Co.**, 1314 Crow Canyon Rd., Hayward, Calif. Owner Builds, **$2,862,000**. 159 HOME subdivision, CONCORD, CALIF.

Crown Constr. Co., 1231 S. La Brea St., Los Angeles, Calif., Owner Builds, **$440,000**. 39 DWELLINGS, 17 St. West, Lorimer Ave. and Avenue "J", LANCASTER, CALIF.

▲ **Robert E. McKee**, 4701 San Fernando Rd., Los Angeles, Calif., LB, **$7,147,000**. (5 bidders) OSTEOPATHIC UNIT at General Hospital, LOS ANGELES, CALIF. Los Angeles Co., Hall of Records, Los Angeles, Calif. Bids Sept. 21, CD 6/30;

Otis Elevator Co., 300 E. 8 St., Los Angeles, Calif., LB, **$442,500** elevator work (Los Angeles, Calif.).

United Constr. Co., 3839 Riverside Blvd., Sacramento, Calif., LB, **$666,839**. Cook Elementary SCHOOL and Babcock Elementary SCHOOL, NORTH SACRAMENTO, CALIF. North Sacramento Elementary School Dist., 110 Dixie Anne Ave., North Sacramento, Calif. Bids Sept. 15. CD 8/30.

▲ **Ford J. Twaits**, 449 S. Beaudry St., Los Angeles, Calif., CA, **$1,306,000**. 2 story, 162x205 ft. masonry, steel OFFICE, ORANGE, CALIF. Pacific Telephone & Telegraph Co., 740 S. Olive St., Los Angeles, Calif. Allison & Rible, 3670 Wilshire Blvd., Los Angeles, Calif., archts.

Hunny Investment Co., 2906 N. Garvey Ave., Pomona, Calif. Owner Builds, **$400,000**. 40 frame, stucco DWELLINGS, Lubin, Browning and Harrison Sts., POMONA, CALIF.

▲ **Hadley-Cherry**, 335 N. La Cienega Blvd., Los Angeles, Calif., Owner Builds, **$1,348,000**. 135 frame, stucco DWELLINGS, Hyde, Lovejoy and Vassar St., POMONA, CALIF. Roland L. Russel, 621 S. Hope St., Los Angeles, Calif., engr.

Bollenbacker & Kelton, Route 1, Box 476, San Diego, Calif. Owner Builds, **$894,400**. 80 frame, stucco DWELLINGS, Allied Gardens Tract No. 5, SAN DIEGO, CALIF.

▲ **James I. Barnes Constr. Co.**, 940 Spring St., Redwood City, Calif., CA **$2,917,900**. Unit 1, University of California MEDICAL CENTER, SAN FRANCISCO, CALIF. University of California, Medical Center c/o Eng., 1379 3 Ave., San Francisco, Calif. CD 8/26, under LB.

▲ **City and County of San Francisco**, Dpt. P. Utilities, City Hall, San Francisco, Calif., received no bids Sept. 15, 200-room HOTEL, San Francisco, International Airport, SAN FRANCISCO, CALIF. **$2,000,000**. CD 8/22.

General Motors Corp., (Chevrolet Div.), 8000 Van Nuys Blvd., Van Nuys, Calif. Owner Builds. **$600,000**. 125x750 ft. FACTORY OFFICE addn., VAN NUYS, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

Ont., Camp Borden—BARRACK BLOCK, etc.—BA 10/18—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, 250-man barrack block and outside services, Canadian Army Base. $500,000. Plans deposit $100.

BUILDINGS—BA

▲ **Ont., Petawana**—STORES, etc.—BA 10/12—Defence Constr. Ltd., 56 Lyon St., Ottawa, Q. M. and technical stores, guard house, lecture training, junior ranks club, etc., Army Camp. $1,000,000. Plans deposit $100.

N. S., Halifax—QUARTERMASTER and TECHNICAL STORES, etc.—BA 10/18—Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. quartermaster and technical stores bldg., outside services, Canadian Army Base. $500,000. Plans deposit $100.

▲ **Sask., Regina**—PLANT—Bids Asked—Hoesch Werke of Dortmund, West Germany, excavation and foundation work for steel pipe plant, near here. $3,000,000. CD 8/31.

HEAVY CONSTRUCTION—LB & CA

Fraser River Pile Driving Co. Ltd., foot of 20th St., New Westminster, B. C., CA **$789,409**, WHARF, ESQUIMALT, B. C. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. J. P. Carriere, c/o owner, engr.

Dawson, Wade & Co., Ltd., 775 Clark St., Vancouver, B. C., CA **$523,140**, rebuilding exten., and parking area at Smithers Airport, SMITHERS, B. C. Dpt. Transport, Hunter Bldg., Ottawa, Ont. CD 6/16, under LB.

▲ **Dominion Bridge Co. Ltd.**, Lachine, Que., LB, **$1,004,500**, supplying, erecting steel for new air terminal bldg., Dorval Airport, DORVAL, QUE. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Sept. 7. CD 8/24.

Canit Constr. Ltd., 507 Place d'Armes St., Montreal, Que., LB, **$555,250**, 48 in. trunk mains, from Champlain to Viau St., MONTREAL, QUE. City, City Hall, Montreal, Que. CD 9/13/44.

BUILDINGS—LB & CA

Rayner Constr. Ltd., 29 Commercial Rd., Leaside, Toronto, Ont., CA, Est. **$750,000**. moving 600,000 cu. yd. earth, sewers, water mains, causeway and road, at cement PLANT, CLARKSON, ONT. St. Lawrence Cement Co., 80 King St., W., Toronto, Ont. Awarded Sept. 16. CD 8/10.

Smith Brothers Constr. Co. Ltd., 1740 Ellen St., Niagara Falls, Ont., CA Est. **$533,000**. HIGH SCHOOL with double grymnasium, NIAGARA-ON-THE-LAKE, ONT. Niagara Town and Township District High School Bd., Niagara-on-the-Lake, Ont. Onasick & McMurtry, 79 Huntley St., Toronto, Ont., engrs. Bids Sept. 14, awarded Sept. 15. CD 8/26.

Doran Constr. Co., Ltd., 5 Concord St., Ottawa, Ont., CA **$800,000**. NOVITATE and SCHOLASTIC BLDG., Base Line Rd., east of Merivale Rd., OTTAWA, ONT. Sisters of Holy Cross, 245 Launier Ave. E. Ottawa, Ont. J. S. Lafort, 86 Greenfield Ave., Ottawa, Ont., archt.

Milne & Nicholls, Ltd., 57 Bloor St. W., Toronto, Ont. CA **$650,000**. BUILDING addn., and altering existing bldg., TORONTO, ONT. Ontario College of Art, Grange Park, Toronto, Ont. Bids Aug. 31, awarded Sept. 15. CD 8/19.

▲ **B. Perini & Sons Canada, Ltd.**, 49 Jackes Ave., Toronto, Ont., CA Est. **$1,750 000**. 12 story, 88x102 ft. rein.-con., steel, brick OFFICE, University Ave. and Adelaide St. W., TORONTO, ONT. Louis Mayzell, 410 Adelaide St. W., Toronto, Ont. Bregman & Hamann, 7 Adelaide St. E., Toronto, Ont., archts. Alex Tobias, 24 Cecil St., Toronto, Ont., engr. Awarded Sept. 15. CD 12/11/53.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ Bids will be taken on the following project under International competitive bidding of NATO.

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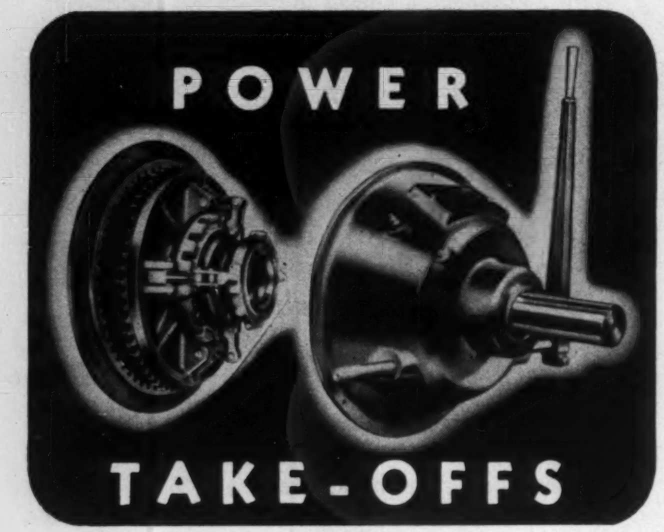
Ministere de l'Industrie et du Commerce, Service Special des Depots d'Hydrocarbures, 85 Boulevard de Montparnasse, Paris, supply pipes for constr. 4 pipe lines: Marseille-Langres (second part from St. Remey to Langres), 520 kilometers 12 in. pipe, est. $9,142,000; Langres-Belfort, 130 kilometers, 8 in. pipe, $1,428,571; Le Havre-Cambrai, 250 kilometers, 12 in. pipe, $4,235,714; Cambrai-Anvers, 55 kilometers, 10 in. pipe, $714,285. Interested firms must file by Oct. 5 separate applications for each pipe line in which interested. Bids will be called for on Oct. 19 and all bids submitted by Nov. 9. For information on bidding NATO projects see 6/25 Construction Daily.

(Proposal Advertisements see pp. 382 to 384)

ROCKFORD



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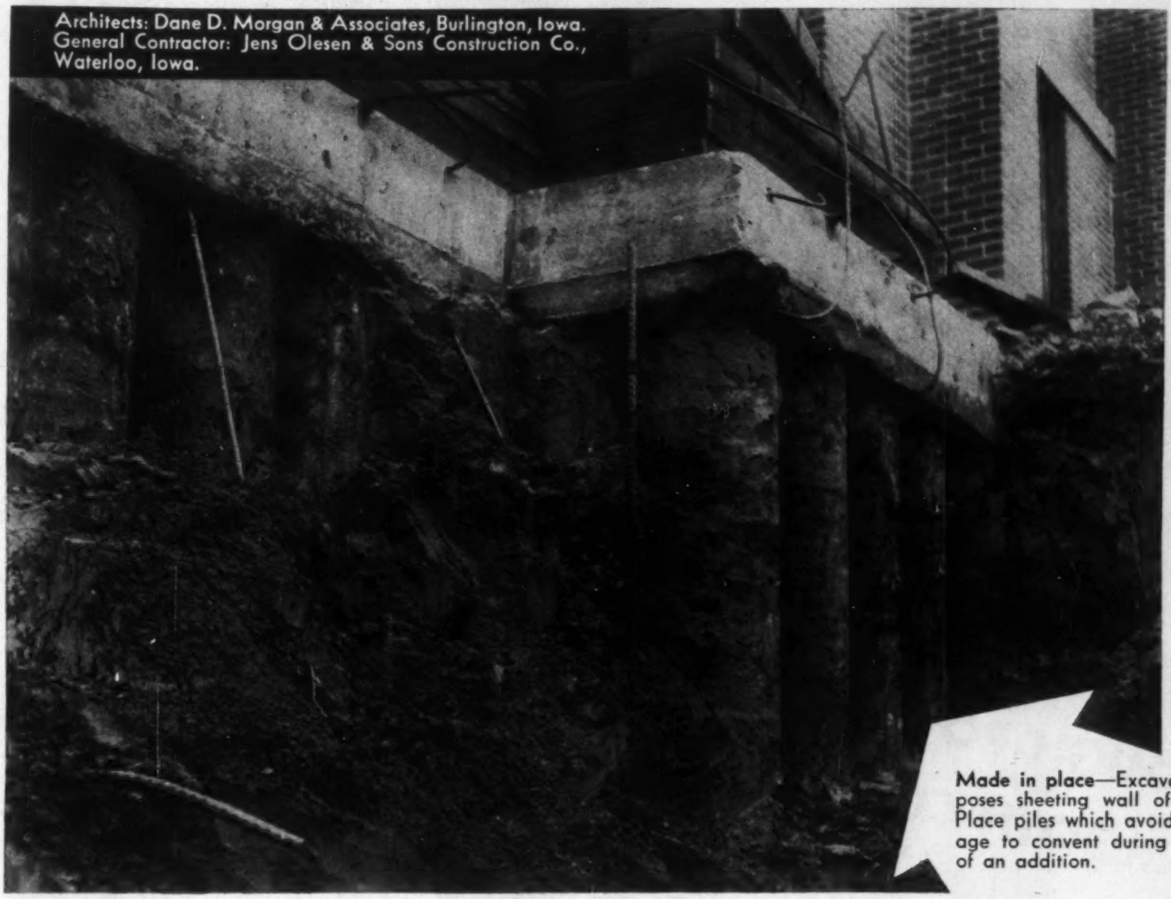
CLUTCHES



Architects: Dane D. Morgan & Associates, Burlington, Iowa.
General Contractor: Jens Olesen & Sons Construction Co., Waterloo, Iowa.

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▶ Intrusion-Prepakt Cast-in-Place piles—*made in place without vibration*—prevented damage from vibration or ground heaving during construction of an addition to Mt. St. Clare Convent & Novitiate, Clinton (Iowa). Overlapping Cast-in-Place piles placed close to an existing building permitted excavation with no settlement. Others placed to bedrock served as bearing piles.

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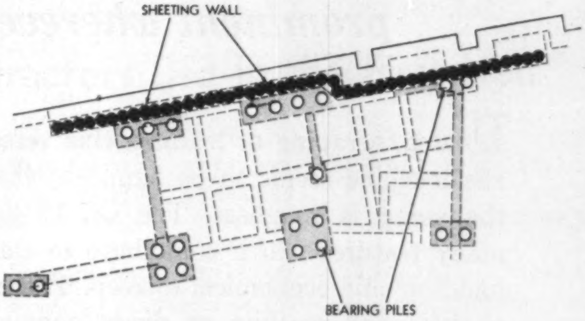

Foundation diagram—Sheeting wall: 47 overlapping Cast-in-Place piles, 16-inch diameter. Bearing piles: 179 Cast-in-Place piles, 12 and 16-inch diameters.

Prepakt maintains a complete field construction organization plus an engineering service, and functions as prime or subcontractor. For further information, write: Intrusion-Prepakt, Inc., Room 779-F, Union Commerce Building, Cleveland.

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Who Will Build the Dallas-Houston Toll Road?

Contest is developing between private group and public authority, as the private group prepares to sell its bonds

J. P. Chamberlain
Associate Editor

Who will build the toll road from Dallas to Houston? The privately-owned Texas Turnpike Co., or the public Texas Turnpike Authority? Will the private group be able to sell its bonds in this tightening money market before the public agency gets legal machinery into action to take over the franchise?

The suspense is building up fast in this toll-road opera. Last week, the authority, which is already building a toll road between Dallas and Fort Worth, authorized Manager J. C. Dingwall to negotiate with engineers for a recheck of the feasibility of the private financing of the Dallas-Houston route.

• **Recheck**—The board is thinking of engaging Coverdale & Colpitts, New York engineering firm. Its survey would go over the existing engineering and traffic data, compiled by the New York engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, and the Chicago firm of De Leuw, Cather & Co.

Some lawyers say the Turnpike Authority has general powers to build toll roads anywhere in Texas—though others think it would have to go back to the legislature for specific authority. At any rate, if the recheck finds that a privately-financed pike between Dallas and Houston is not feasible, the authority could move to take over financing and construction of the facility. Or the recheck might show that certain segments of the route are feasible, perhaps a stretch north from Houston, or from Dallas to Waco.

• **Lehman offer**—The New York investment firm of Lehman Brothers, financial adviser to the authority, has offered to put up the money for the recheck, along with First Boston Corp. and First Southwest Co. In return, the three firms ask for the privilege of getting first crack at negotiating an arrangement to underwrite bonds the authority would sell. If this is arranged, Lehman would resign as financial adviser.

Meanwhile, the private group says it will offer $130 million of bonds to finance a 210-mi. pike within the next few weeks, through a syndicate headed by Glore, Forgan & Co. of New York and Chicago. Glore, Forgan says that the move by the other group is "an attempt to get our deal off balance"—in other words, to hurt the marketability of the bonds.

• **Skeptical**—However, in Wall Street this week most observers were skeptical about the private group's bond issue. An attempt to sell bonds failed last February, when the bond market was stronger. These bonds would be exempt from federal income tax, but unlike publicly-owned toll roads, the property would be subject to local property taxes.

• **Special setup**—The Glore, Forgan syndicate has arranged a special setup to sell the bonds, similar to the financing that in late 1953 finally put over the often-deferred Mackinac Bridge financing.

The bonds will be set up like this: There would be $90 million of 4% Series A bonds, which would get first call on all revenues left after operation and maintenance costs. Next would come $40 million of 4¾% Series B bonds. No more of the Series A bonds could be issued to finance any further construction. Because of this closed-end feature, and because of the high coupon rate, the underwriters hope that enough institutional investors will line up to buy the Series A bonds.

Glore, Forgan believes it already has individual investors lined up to buy the very speculative Series B bonds. Buyers of these bonds are taking a risk that there would not be enough revenue left to pay full interest after servicing the Series A bonds. But for a wealthy investor, the potential yield of 4½% is the same as a much higher yield on taxable securities.

• **Route**—The private group's toll road would run from a point near Dallas to a point about 10 mi. north of Houston. Due to good feeder roads in both metropolitan areas, engineers have decided that it is not necessary to bring the pike any closer in.

You probably will get the answer to this cliff-hanger within a few weeks. If the private Texas Turnpike Co. offering fails now, it seems likely that the authority will eventually build the toll road.

How Contractors Did in the First Half

	Sales		Profits	
	1955	1954	1955	1954
Arundel	**$10,486,279**	**$7,931,577**	**$592,731***	**$293,450**
Fluor**	**58,081,078**	**42,943,886**	**698,191**	**345,532**
Great Lakes Dredge	**NA**	**NA**	**325,094**	**D142,050**
Merritt-Chapman	**162,339,184**	**60,443,519**	**3,611,462**	**1,121,852**
Morrison-Knudsen	**66,179,000**	**66,138,000**	**2,546,743**	**1,640,412**

* Includes price adjustment for prior years and other non-recurring income. Otherwise, net income would have been below the 1954 period.

** Six months ending July 31.

D—deficit.

Few U. S. contractors report annual sales and earnings to the public. And fewer still report quarterly and semi-annual results. The table (above) shows only a handful of first-half sales and earnings.

From these few figures, it is difficult to draw any general conclusions as to how contractors as a whole were doing in the first half of this year. However, cost and price indexes for the first six months of the year indicated that the prices contractors were charging for their work were rising faster than their costs (ENR Aug. 11, p. 160).

The figures shown in this table bear out the indexes, for most of the firms listed increased their sales. And—what is even more encouraging—they increased their profit margins. In other words, their earnings increased at a faster rate than their sales.

Merritt-Chapman's fast gain is of course largely accounted for by mergers of other companies. And Arundel's pickup in profits was the result of nonrecurring earnings.

In general, however, these figures give a rather optimistic picture.

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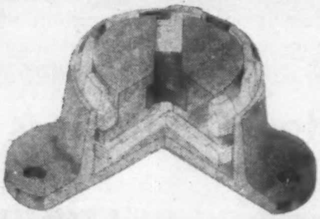

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Management Change at M-M May Lead to Sale or Merger

A dissident stockholders group last week succeeded in getting control of Minneapolis-Moline Co. away from the present management. This may lead to sale or merger of the firm.

Since July, a stockholders group led by Edward S. Reddig, executive vice-president of White Motor Co., has been trying to take over. Now a favorable opinion by the Securities & Exchange Commission has cleared the way.

SEC ruled that the management was legally bound to mail out to stockholders the proxy material of the insurgent stockholders' committee. That decided the management group, headed by President Warren C. MacFarlane, that any further fighting would serve no useful purpose.

Now Reddig is in as board chairman, with six other directors of his group, or seven out of 10 seats. MacFarlane will remain as president and as director. According to Reddig, there will be no change in top management. While his group stated early in the management fight that its purpose was to sell or merge Minneapolis-Moline, Reddig says his group has "no definite ideas as yet."

Reddig is most emphatic that there will be no merger with White.

AEC Will Accept Proposals For Small Private A-Plants

The Atomic Energy Commission has just announced the second phase of its aid program to private A-power plants. This week, it asked utilities, equipment makers, and others to submit proposals for plants in one of three ranges: 5,000 to 10,000 kw; 10,000 to 20,000 kw; and 20,000 to 40,000 kw. The deadline is Feb. 1, 1956.

This phase of the program is intended to develop data on the value of small power reactors for commercial use. And, of course, it's hoped atomic technology will be advanced in the process.

AEC can give outright financial aid—as it is giving to the first big A-plant now under construction at Shippingport, Pa. (ENR Sept. 15, p. 23)—or it can lend nuclear fuel without charge, lend the use of its laboratories for research and development, and pay for technical and economic data resulting from design, construction, and operation of the plant.

(*B&F continued on page 376*)

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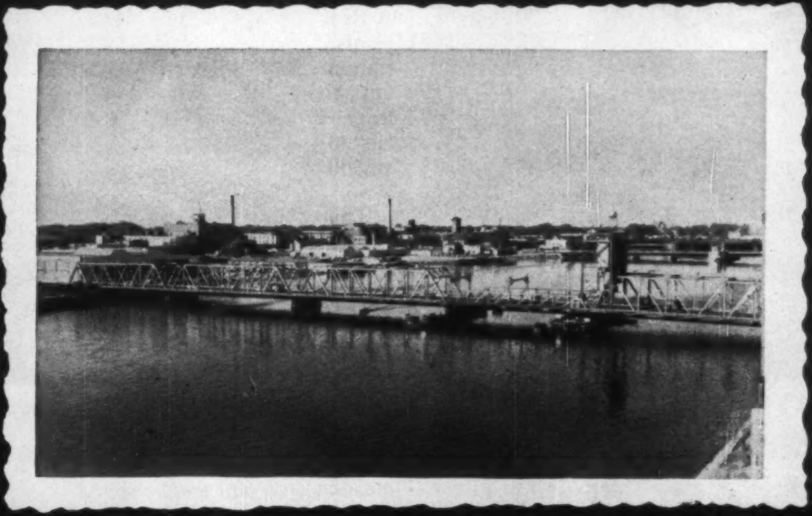

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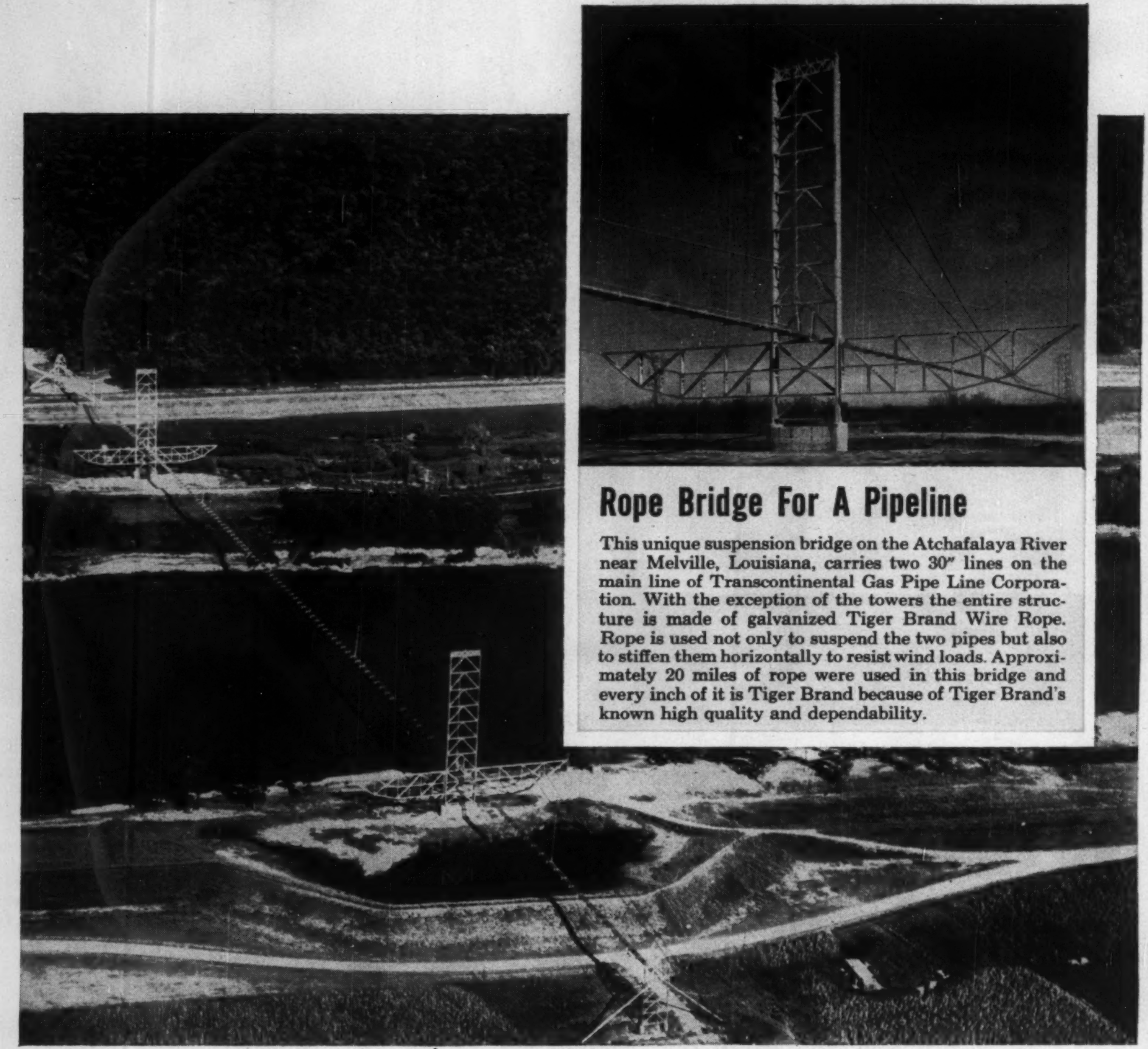

Rope Bridge For A Pipeline

This unique suspension bridge on the Atchafalaya River near Melville, Louisiana, carries two 30" lines on the main line of Transcontinental Gas Pipe Line Corporation. With the exception of the towers the entire structure is made of galvanized Tiger Brand Wire Rope. Rope is used not only to suspend the two pipes but also to stiffen them horizontally to resist wind loads. Approximately 20 miles of rope were used in this bridge and every inch of it is Tiger Brand because of Tiger Brand's known high quality and dependability.

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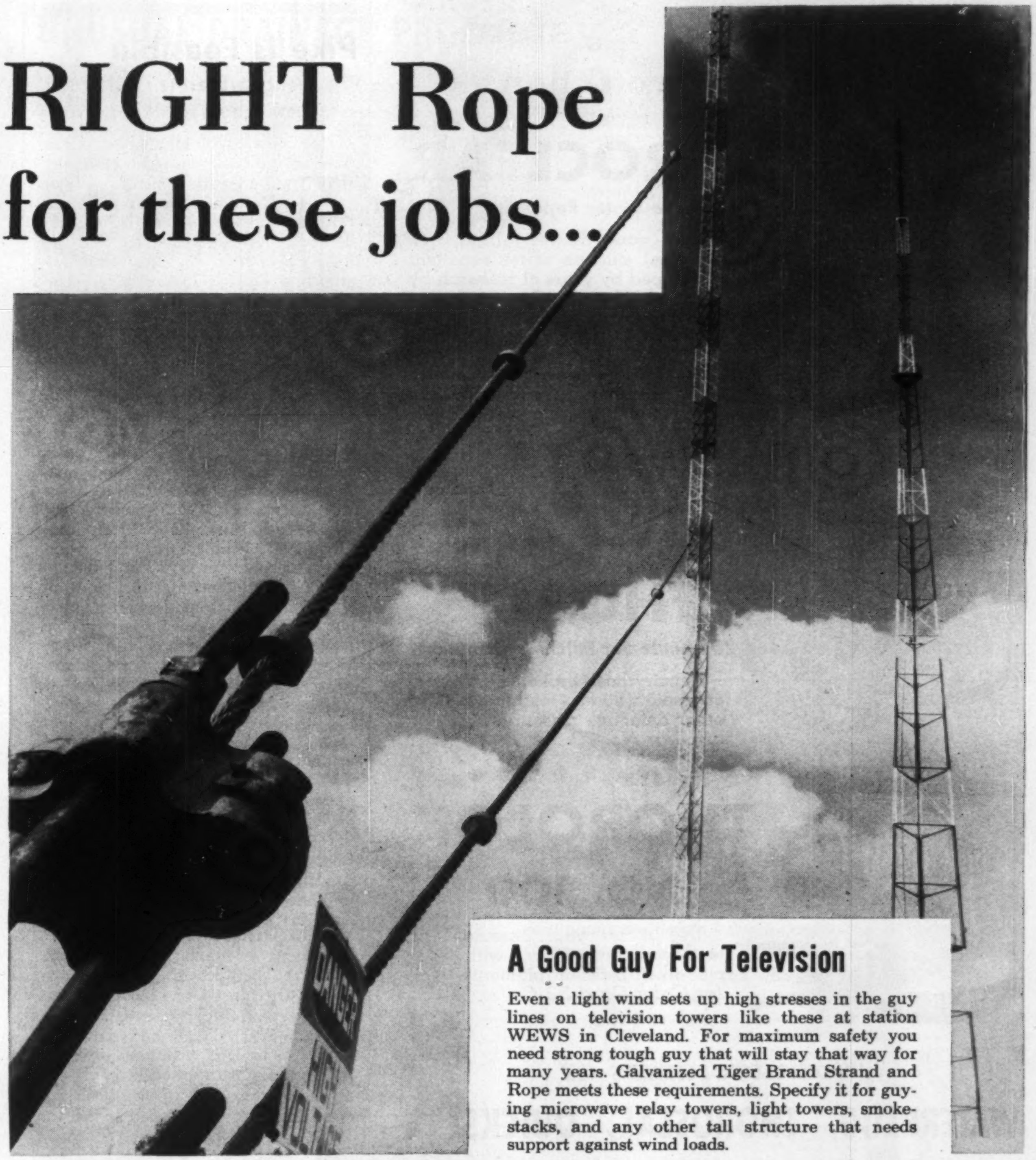

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Seattle-Everett toll road gets engineers' approval

Last week, as a local court began hearing evidence on legality of the state law authorizing a $227-million toll road from Tacoma, Wash., through Seattle to Everett, the State Toll Bridge Authority received its final report from the New York engineering firm of Coverdale & Colpitts on revenue estimates for the 65-mi project.

The report was favorable, slightly more optimistic than a preliminary estimate made last February. It figures that the toll road would be self-supporting in its second year.

• **Could open in 1959**—If the courts uphold the enabling act, condemnation for the route is expected to begin early next year, with construction scheduled to start later in 1956. Completion is scheduled for 1959, when initial revenues of $10.2 million are expected. After maintenance and operation costs, the report estimates that about $7.8 million would be available for debt service, which is estimated at $7,945,000 on 30-year bonds drawing 3½% interest. The difference could be made up from a $5-million contingency guarantee from the motor-vehicle fund authorized by the state legislature this year.

In the second year of operation, net revenue available for debt service is estimated at over $9.3 million, well in the black. Gross revenue, before maintenance and operation is expected to reach a peak of $23.5 million by 1988.

• **Major traffic route**—The largest movement of traffic on the route would be between the Seattle business district, just a few blocks off the highway, and the residential district to the north. This would require a high-level bridge. About one-third of total revenue is expected here. Traffic on the tollway in downtown Seattle is estimated at 69,300 vehicles daily in 1960.

• **Barrier stations**—Daily movement for the whole length of the route, according to the report, is likely to be only about 720 vehicles. Another 7,700 will get a free ride daily on sections between pay stations. The report figures that a driver going the whole 65 mi would save 1½ mi and 27½ minutes, in spite of seven stops at barrier stations.

(*B&F continued on page 378*)

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Repair those broken sills, steps, concrete floors, chimneys and other defective masonry! *Ask for circular No. 20.*

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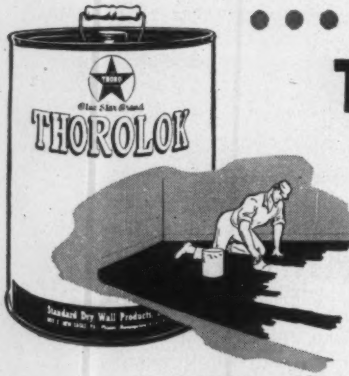

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Felker Concrete Cutter SOLVES UNUSUAL DRAINAGE PROBLEM

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Two cuts, 3" deep and ½" deep, are made around trench locations with this Felker Model 200 Concrete Cutter using a 14" Felker Segmented Type Diamond Blade.

Concrete between the deep and shallow cuts is chiselled out to form a ledge. NOTICE how it supports the steel cover plate.

Felker concrete cutting machines fulfill a wide scope of applications—on streets, sidewalks, highways and wherever paving exists. This interesting application of a Felker model 200 saw solved a difficult problem at nominal cost . . . again proving the economy and feasibility of sawing versus breaking out.

Surface oil deposits seeping through cracks in concrete paving created a neighborhood nuisance in this service station. Since the tar was too heavy to dispose of in the sewers, drainage pits proved the only answer. These were constructed by sawing through the concrete to reach the oil strata beneath. A ledge was chiselled between the pit and an outside cut to support steel cover plates. The completed job presented a neat, clean, safe surface and only periodic removal of the tar is required. The same idea appears practical for controlling wet basements and other water bearing pavement.

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FELKER SEGMENTED TYPE DIAMOND ABRASIVE WHEELS
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FELKER

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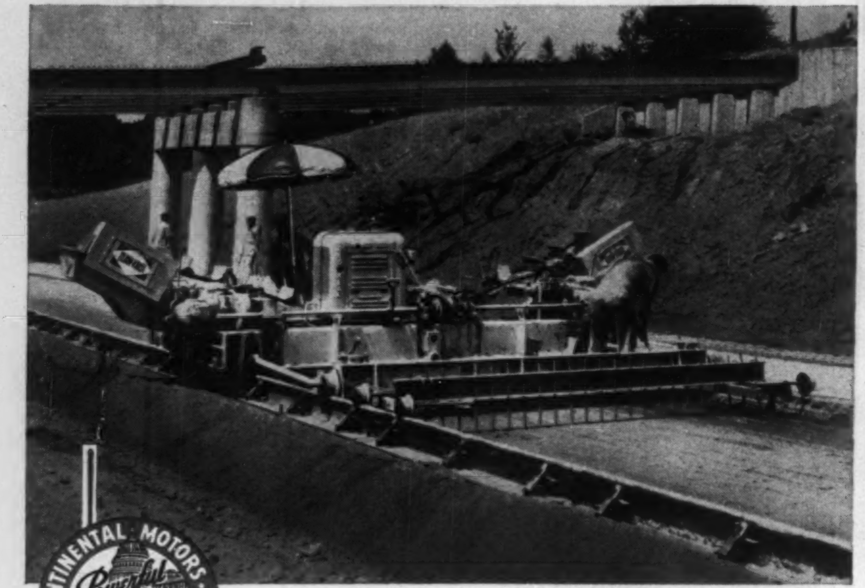

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Red Seal Power

Specialized machines such as this Model "GB" Blaw-Knox Precision Subgrader account for the amazing rapidity with which the highway network is expanding to meet this country's needs. This unit, with its extra discharge horn permitting discharge of spoil at either end, is only one of a steadily-lengthening list of special-purpose equipment utilizing Red Seal power. You find Red Seals, today, building prestige for the makers—and earning *profits* for the users—of leading makes of pavers, graders, mixers, compressors, earth-movers, ditchers, shovels, rollers and numerous other machines. You can clinch on-time performance by standardizing on equipment which offers the plus-value of dependable Red Seal power.

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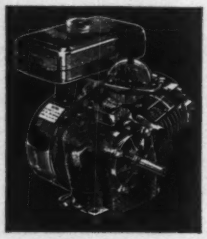

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BUSINESS AND FINANCE

Low Grading, Drainage Bids Pay for Toll Road Extension

The Florida Turnpike Authority will go ahead with its plan to add 6½ mi to the southern end of the "Bobtail" turnpike between Hollywood and Ft. Pierce, bringing it closer to Miami and helping to relieve that city's already overloaded highways (ENR Sept. 1, p. 26).

Although it has so far awarded grading and drainage contracts on only 62 mi of the original 110-mi route, the authority has already saved just about enough money to pay for the $3.5-million extension. Contracts let up to Sept. 1 averaged 61% of engineers' estimates. They totaled about $5.3 million, a saving of nearly $3.4 million.

• **Other extras**—The authority also said last week that it has $2¼ million of extra money in the form of bond discount, in the difference between estimated interest during construction and the actual lower interest rate being paid during construction, and income from reinvestment of its borrowed funds. There is also a $6½-million contingency fund.

Traffic engineers estimate that extending the toll road will add at least another $400,000 more gross revenue in the first full year's operation.

Business Briefs . . .

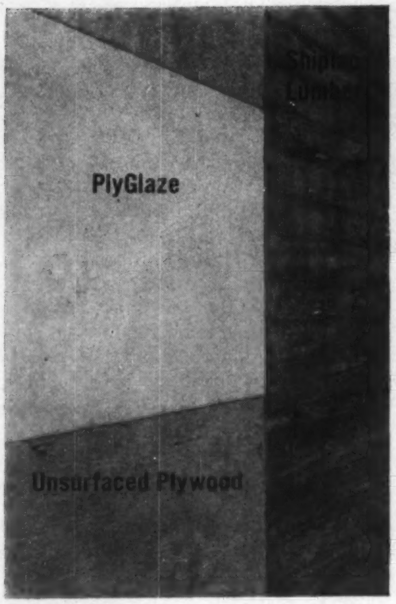
• **Sears, Roebuck** plans to spend $56 million on construction in 1956, about $14 million more than in 1955. Next year's program will bring the total amount spent on retail construction to $400 million since World War II.

• **Unfilled orders** of the Douglas fir lumber industry declined from 822,965 Mftbm at the end of July to 766,700 at the end of August, according to the West Coast Lumbermen's Assn.

• **New York Thruway** revenues in August were up 3.8% from July. Revenue from commercial vehicles was up 23.6%.

• **Hydro plant**—Portland (Ore.) General Electric Co. expects to build a $19-million hydro plant of 75,000 kw capacity on the Clackamus River about 30 mi east of Portland.

• **B-I-F Industries, Inc.,** of Providence, is no longer making water-pipe fittings. That part of its business has been sold to Warren Pipe & Foundry Co., Boston.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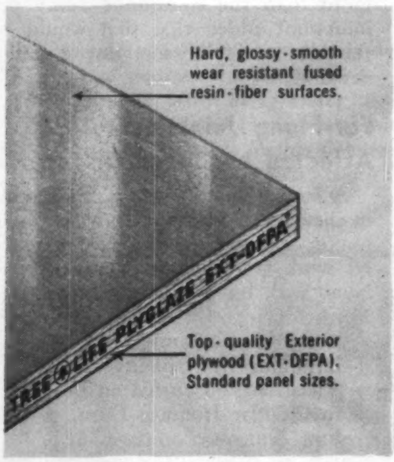
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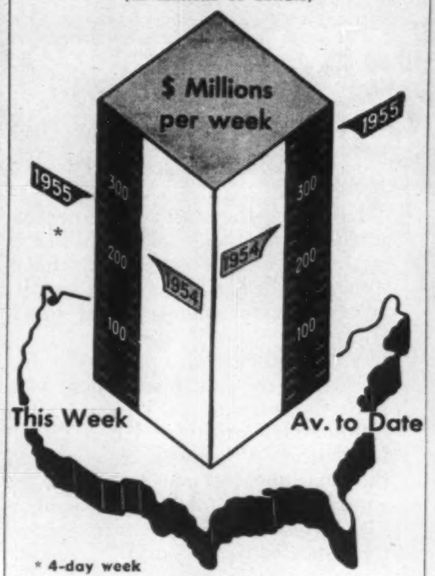
Activity This Week

As reported to ENR
(In millions of dollars)



* 4-day week

Amount of contracts let

(millions of dollars)

By Ownership	This Week*	Cumulative 39 wks 1955	1954	% chge
Federal	$37.1	$1,289.1	$920.5	+40
State and municipal ...	74.7	4,053.1	3,738.9	+8
Total public....	111.8	5,342.2	4,659.4	+15
Total private...	154.3	8,792.0	6,168.8	+43
U. S. Total....	$266.1	$14,134.2	$10,828.2	+31

By type of work

Waterworks	$3.8	$205.1	$175.2	+17
Sewerage	3.4	301.0	281.7	+7
Bridges	12.2	358.8	389.1	—8
Highways	33.7	1,662.1	1,443.4	+15
Earthwork, waterways ...	27.0	406.5	207.0	+96
Buildings:				
Public excl. hsg.	28.8	1,311.7	1,324.3	—1
Public housg..	..	220.5	183.0	+20
Private housg.	72.5	4,777.7	3,210.8	+49
Commercial ..	16.6	1,272.7	1,013.9	+26
Industrial ...	62.4	2,055.2	1,455.2	+41
Unclassified	5.7	1,562.9	1,144.6	+37
U. S. Total....	$266.1	$14,134.2	$10,828.2	+31

* 4-day week

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

New capital for construction

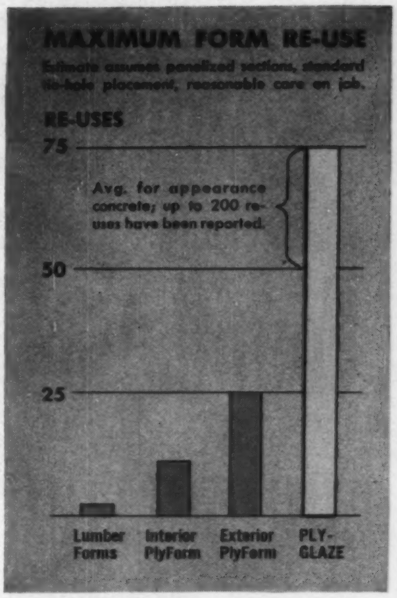
(millions of dollars)

	Week of Sept. 22	Cumulative 38 Wks 1955	% Chge '54-'55
Corporate securities......	$99.3	$2,498.7	+15
State and municipal:			
All except housing.....	59.9	2,995.9	—25
Housing	...	72.0	—21
Federal loans	12.4	104.6	+14
Federal aid	...	835.5	+27
Total nonfederal	$171.6	$6,524.6	—7
Federal appropriations:			
In U. S.............	...	$3,379.7	+63
Outside U. S.........	...	84.6	+155
Total new capital........	$171.6	$9,988.9	+9

ENR cost and volume indexes, 1955

		Base years = 100 1913	1926	1949
Construction cost ...	9/22	673.40	323.70	141.17
	9/1†	672.80	323.41	141.04
Building cost	9/22	480.02	259.48	136.45
	9/1†	479.21	259.05	136.22
Volume	Aug.	508	207	147
	July	699	284	202

† Official ENR Indexes for Sept.



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LABOR

GAW Rolls Along

Big gains made by CIO as labor seeks security

Last week the scoreboard for guaranteed annual wage plans showed a total of 71 firms whose new contracts with the UAW-CIO contain supplemental unemployment benefit provisions.

In announcing the progress it has made since the June 6 settlement with Ford, the International Union, United Automobile, Aircraft and Agricultural Implement Workers of America said the plans now cover 867,200 members —nearly 60% of the union's membership. With additional contracts now under negotiation, it added, thousands more "will also be able to enjoy the protection of GAW in the near future."

According to reports received by ENR, the construction industry has not yet noticed any significant effects of this GAW momentum, although both labor and management are giving it increased attention (see page 144). Some members of the industry feel it will hit construction soon, and say it has already made the building trades more "cocky" and has contributed to higher wage boosts for the unions.

A spokesman for one of the Building and Construction Trades Councils summed up the GAW impact this way: "I think the guaranteed annual wage has influenced building trades unions to some extent. It has brought discussion, although nothing has developed. It will happen eventually, but the construction industry usually lags behind the others because of problems of application."

Among the companies included in last week's UAW tally are many that produce construction equipment—International Harvester. Caterpillar, Allis-Chalmers, John Deere, White Motor, Midland Steel and Borg-Warner, to name a few. The agreement with Allis-Chalmers, considered an improvement over the Ford pattern, accelerates the building up of credit units and provides for benefits of 65% of take-home-pay for laid-off workers for 26 weeks.

Meanwhile, various steps have been taken to facilitate operation of the plans. Rulings have been obtained in Michigan, Massachusetts and Connecticut to permit payment of GAW benefits without prejudice to unemployment insurance compensation. In Maryland, efforts—vigorously protested by the Associated Builders and Contractors of Maryland—are underway to amend the state unemployment insurance law to accommodate GAW plans. Labor Secretary Mitchell has ruled that company contributions for overtime hours are payable at straight time. And deductibility of employer contributions for federal income tax purposes is under consideration by the Internal Revenue Service.

Canadian Workers Enjoy Employment Boom in West

Construction employment in British Columbia (ENR Aug. 25, p. 81) still rolls along at a postwar high.

In one of the most confident reports ever released by the Vancouver Building Trades Council, 10,000 carpenters are reported at work with many more skilled men needed. Heavy residential, commercial and industrial building has practically every skilled tradesman working.

"There's no doubt it's the best year we've ever had since the war's heavy demands on construction men," said Ed Kennedy, BTC secretary. "The large amount of construction started this past summer should tide us over the winter and cut down the number of unemployed."

All plumbers and painters are working; carpenters—"could use another 100 in Vancouver and New Westminster alone"; the plasterers, floorlayers' and lathers' unions have been short of skilled men for two years and claim they can not get enough apprentices to keep up with the demand; and there is a shortage of sheet metal workers.

In Victoria, E. T. Staley, secretary of the Provincial Council of Carpenters, said the shortage of skilled carpenters may force employers to pay more than the minimum $2.25 per hour—but added that that would be the employers' choice, not a union demand.

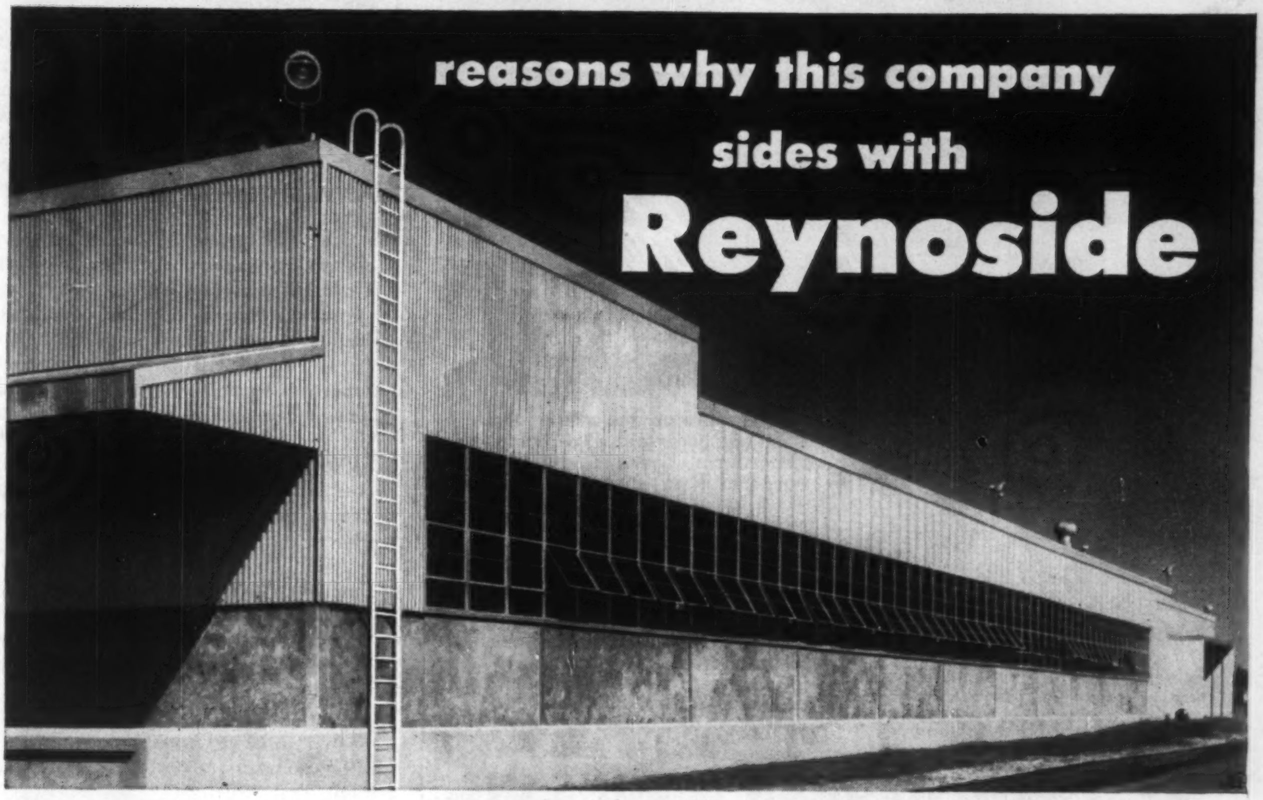
Far-Flung Joint Ventures Affected by Labor Dispute

A jurisdictional dispute that arose in Tennessee with a Minnesota contractor was reported to have touched off work stoppages in Kentucky and New York on projects in which the Minnesota contractor had an interest as member of a joint venture.

Simultaneous walkouts, referred to as "vacations," occurred on the multimillion dollar Iroquois Dam, part of

(*Continued on page* 382)

"Low-Cost and Maintenance-Free"...



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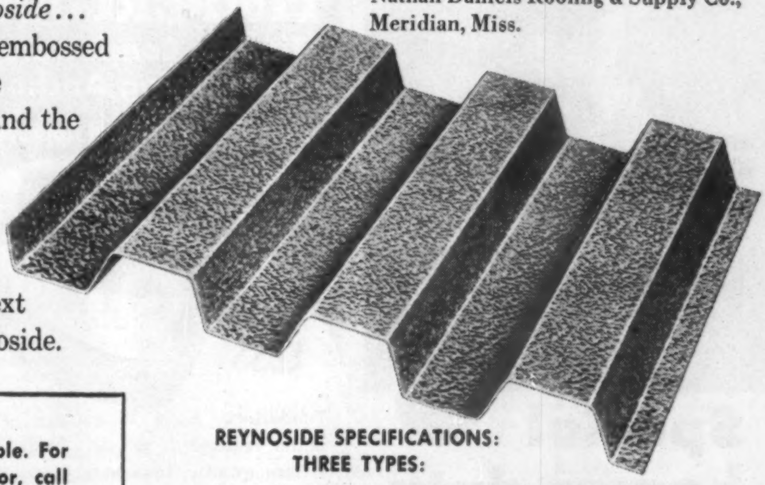

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Finish: Stipple-embossed.
Lengths: From 5' to 14' 5½". Special lengths to order.
Width: 41⅝" over-all; nominal coverage 40".
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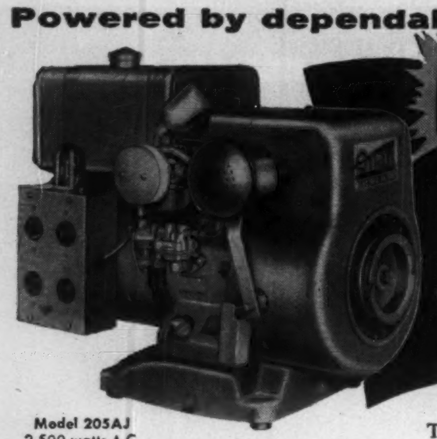
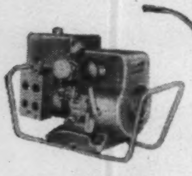
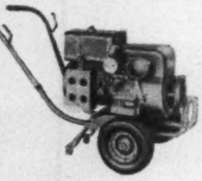
New **ONAN** Portable **ELECTRIC PLANTS**



Model 205AJ
2,500 watts A.C.



CARRYING FRAME for hand lifting and moving.



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Multiple receptacles allow direct plug-in of several floodlights or heavy-duty electric tools, supplying a whole crew with labor-saving electric power.

These new plants are completely Onan-built with Onan engines direct-connected to Onan generators for trouble-free long life. Carrying frames and two-wheel dollies are optional equipment.

Onan Portable Electric Plants: 500 to 5,000 watts.

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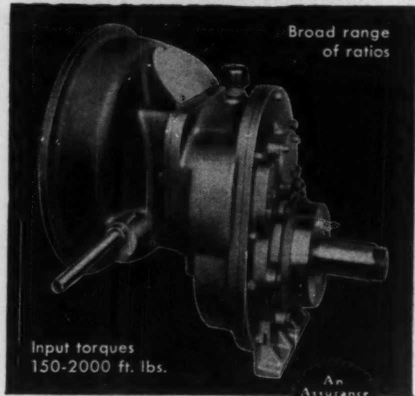

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BEATRICE NEBRASKA

the St. Lawrence power project, under construction near Point Rockaway, N. Y., and on the reconstruction of Green River's Lock No. 1, near Spottsville, Ky. Picket lines were not established. Sources at the sites said they didn't know what caused the stoppages.

The walkout at the New York project was complete and lasted two days. Crafts that participated include teamsters, carpenters, laborers, operating engineers, electricians and millrights. All the key construction workers were reported to be employes of Peter Kiewit Sons Co. of Omaha, one of the members of the joint venture. Other members are Arthur A. Johnson Corp. of New York and the Minnesota firm—Al Johnson Construction Co. of Minneapolis.

Members of five unions—operating engineers, carpenters, laborers, teamsters, and ironworkers—walked out on the Kentucky project. Contractors are Peter Kiewit Sons and Al Johnson Construction Co.

Also affected were another Johnson-Kiewit project in Minneapolis and three Johnson projects in Minnesota, Ohio and Arkansas.

Labor Briefs . . .

- **Boost for carpenters**—In Eau Claire, Wis., the Chippewa Valley Contractors' Assn., has signed a one-year contract with the District Council of Carpenters, granting a 20-cent wage boost and ending a four-week strike.

- **New building code?**—The Kentucky State Council of Carpenters has voted to seek enactment of a state carpentry and materials code for home builders. Particularly noting use of scrap materials in new homes, a council spokesman said, "The general public has been cheated . . . in the construction of residential property."

- **Welfare funds**—The State Insurance Commissioner in Washington is about to mail questionnaires, returnable Nov. 1 and open to public inspection, to all welfare fund administrators and insurance companies. After replies have been evaluated, an investigation of funds will be made.

- **Asbestos workers** — New journeyman's rate for asbestos workers in Kentucky and southern Indiana is \$3.22½ as a result of a two-year contract with the Master Insulators Association of Louisville and Lexington. Members of Local 51 get a 12½-cent boost now, with another 10 cents next September.

Bids: October 25, 1955

Contract NYA-590.004

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THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
CARGO BUILDING NO. 84

Sealed proposals for the construction of Cargo Building No. 84 at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

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for Opportunities to bid. They might not see your announcements if printed elsewhere.

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

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Bids: October 25, 1955

Contract LT-160.015

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LINCOLN TUNNEL—THIRD TUBE
WIDENING VIADUCT IN NORTH
BERGEN, N. J. SUPERSTRUCTURE

Sealed proposals for widening the viaduct between State Highway Route Number 3 and Prospect Avenue, North Bergen, N. J., on the approach to the Lincoln Tunnel will be received at the office of the Chief Engineer of the Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

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THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Bids: October 25, 1955

Contract EXD-130.022

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THE PORT OF NEW YORK AUTHORITY
PORT AUTHORITY BUILDING
SECOND FLOOR ALTERATIONS

Sealed proposals for performing alterations to the second floor of the Port Authority Building at 111 Eighth Avenue, New York 11, N. Y. will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 25, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Bids: October 18, 1955

Contract NYA-650.010

ADVERTISEMENT

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
INTERNATIONAL ARRIVAL BUILDING
AND AIRLINE WING BUILDINGS
FOUNDATIONS

Sealed proposals for constructing foundations for the International Arrival Building and Airline Wing Buildings at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, October 18, 1955, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the office of the Engineer of Materials of the Authority, Room 1112. Documents will be furnished upon deposit of $30.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $30.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt shall be delivered to Room 1112, where the documents will be furnished.

Those who have submitted a bid on the contract will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Donald V. Lowe, Chairman

New York, September 29, 1955

Prequalification Date: October 4, 1955

Board of Education
Bureau of Construction

Notice Re Prequalification Forms for Contractors.

NOTICE IS HEREBY GIVEN THAT THE Director of the Bureau of Construction, Fourth Floor, 42-15 Crescent Street, Long Island City 1, New York, will receive applications for prequalification of bidders, from contractors who may wish to submit bids for the proposed hereinafter specified contracts, as follows:

For (1) general construction, (2) plumbing and drainage, (3) heating and ventilating, (4) electrical work and lighting fixtures for the following schools:

BOROUGH OF QUEENS

Public School 73, 54th Ave. & 71st St., Maspeth, Modernization of existing building & Conversion to a Junior High School. Junior High School 189, 147th St. between Barclay & Sanford Aves., Flushing, new building.

BOROUGH OF BROOKLYN

Public School 58, Smith St. between Carroll St. and First Place, new building. Junior H.S. 278, Stuart & Fillmore Aves., new building. Public School 262, Underhill Ave. between Bergen St. & St. Marks Ave., new building.

BOROUGH OF RICHMOND

Public School 44, 80 Maple Parkway, Mariners Harbor, New Addition to & Modernization of existing building.

Prequalification application forms will have to be secured and must be submitted to the Director, Bureau of Construction office, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, New York.

Bids will be received from prequalified bidders only.

The time for submitting prequalification application forms for the above contracts will expire on Tuesday, October 4th, 1955.

WILLIAM H. CORREALE
Director

Dated: September 16th, 1955

OFFICIAL PROPOSALS

Bids: October 19, 1955

Power Authority of the State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF
GANTRY CRANES AND TRAVELING
CRANE FOR
BARNHART ISLAND POWER PLANT
SPECIFICATION NO. PA-5-15050
ST. LAWRENCE CONTRACT NO. P20

NOTICE TO CONTRACTORS: THE POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the design, manufacture, and furnishing of one 300 ton gantry crane, one 90 ton gantry crane, and one 150 ton traveling crane and delivery thereof f.o.b. destination as follows:

(1) If delivered in person on the day of receiving bids, until 10:30 A.M. Eastern Daylight Saving Time on the 19th day of October 1955, in Hearing Room C on the 6th floor, 270 Broadway, New York 7, New York.

(2) If mailed in, until 10:15 A.M. Eastern Daylight Saving Time on the 19th day of October, 1955 at the Authority's Office, 270 Broadway, Room 1300, New York 7, New York.

The proposals will be publicly opened and read aloud at the time and at the address given in (1) above.

Bids will be entertained for any one, any two, or all three of the cranes, in accordance with the bidding schedules. Erection at the site of installation will be done by Others.

Plans, specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, may be inspected by prospective bidders during office hours and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Twenty ($20.00) dollars per initial set of contract documents and Ten ($10.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. A bid deposit will be required with each bid in an amount not less than 10 percent of the maximum price bid for any bid schedule.

Bids will not be restricted to American manufacturers.

The right is reserved to reject any and all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: October 10, 1955

Construction of Pumping Station and Office Building

ADVERTISEMENT

Notice is hereby given that sealed bids will be received in accordance with the law by the Hampton Roads Sanitation District Commission, until three P. M., Eastern Standard Time on the tenth day of October, 1955 at the office of the Commission, Board of Trade Building, Norfolk, Virginia, for furnishing materials and performing the labor for constructing a combined sewage pumping station and office building including connecting gravity, bypass and force main sewer lines at the corner of Plume and Atlantic Streets, all in accordance with the plans and specifications prepared by Buck, Seifert and Jost, Consulting Engineers, 112 East 19th Street, New York 3, New York.

Copies of the plans and specifications may be obtained either from the Commission or from the Consulting Engineer upon deposit of Forty ($40.00) Dollars, which sum will be refunded upon return of the plans and specifications in good condition within ten (10) days after the date on which bids are received or else the entire deposit will be forfeited.

Each proposal must be accompanied by a certified check in amount equal to one (1%) percent of the proposal, together with a bid bond in amount equal to ten (10%) percent of the proposal. The checks and bid bonds of all except the three lowest bidders will be returned within three (3) days after the opening of the bids while the remaining checks and bid bonds will be returned as soon as the contract has been executed. The certified check and bid bond of the successful bidder will be retained to pay for any damage or loss to the Commission in case such successful bidder shall neglect or refuse to enter into a contract in accordance with his proposal.

The Commission reserves the right to consider bids for fifteen (15) days after their receipt before awarding any contracts and the right is reserved to accept any bid or to reject any or all of them.

E. T. Greshan, (Chairman)
J. V. Morris (Vice Chairman)
G. A. Treakle
M. B. Wagenheim
Clark R. Nickerson
COMMISSIONERS, HAMPTON ROADS SANITATION DISTRICT COMMISSION

Charles B. Borland, Manager
Buck, Seifert and Jost
Consulting Engineers

Bids: October 28, 1955

Construction of Sewerage Treatment Works

NOTICE TO BIDDERS

Sealed proposals for the construction of Additional Sewers and New Sewage Treatment Works will be received by the Board of Sewer Commissioners of Hamilton College Sewer District at their office at Hamilton College, Clinton, New York, until four o'clock P.M., E.D.T. on the 28th day of October, 1955.

Information for bidders can be obtained at the office of William S. Lozier Company, Engineers, 10 Gibbs Street, Rochester, New York. Copies of plans may be obtained upon the payment of Ten Dollars ($10.00) for each set, which will not be refunded.

The work consists of Section "A", the construction of approximately 6,000 feet of 8" sanitary sewer and 3,000 feet of 12" sanitary sewer and Section "B", a sewage treatment plant consisting of brick building, comminutor, clarifier, digestion tank and sludge bed with appurtenances.

BOARD OF SEWER COMMISSIONERS
Norman G. Lewis, Secretary
September 29, 1955

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4479) will be received at Rock Springs, Wyoming, until November 1, 1955, for furnishing labor and materials for earthwork and structures for Eden laterals, sublaterals, drains, and wasteways, Eden Project, Wyoming. Location near Eden, Wyoming. Principal items are 604,000 cu. yds. excavation; 123,000 cu. yds. earth lining; 1,290 cu. yds. concrete in structures; 5,600 lin. ft. concrete pipe, 18- to 66-inch; and other work. Completion time 960 days. For particulars, address Bureau of Reclamation, P.O. Box 944, Rock Springs, Wyoming; or Building 53, Denver Federal Center, Denver 2, Colorado, W. A. Dexheimer, Commissioner.

BUREAU OF RECLAMATION NORTH PLATTE RIVER PROJECTS 91255-P4 CASPER, WYOMING UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION NOTICE IS HEREBY GIVEN that sealed bids on Specifications No. 703C-384 for furnishing all labor, equipment, and materials and performing all work for COMPACTED EARTH LINING FOR CASPER CANAL, STATION 1164+00 TO STATION 1194+00, STATION 2038+00 TO STATION 2043+00, AND STATION 2073+50 TO STATION 2087+00, Kendrick Project, Wyoming, will be mailed to Box 280, Casper, Wyoming or delivered to the office of the Bureau of Reclamation in time for the public opening at 10:30 a.m., Mountain Standard Time, October 11, 1955, at the office of the Bureau of Reclamation Center, Casper, Wyoming.

Copies of the standard forms and of the specifications may be obtained from the following offices of the Bureau of Reclamation: R. J. Walter, Jr., Regional Director, Building No. 46, Denver Federal Center, Denver, Colorado; and I. J. Matthews, Projects Manager, Box 280, Casper, Wyoming. No charge for copies of the specifications and drawings furnished for bidding purposes; for all others $0.50 per copy, not returnable. Payments should be made by check or money order payable to the Treasurer of the United States.

I. J. Matthews

NAME AND LOCATION OF PROJECT—Project No. 53-103, Additional Section of Intercepting Sewer Charlotte Amalie, St. Thomas, Virgin Islands. DEPARTMENT OR AGENCY—OFFICE OF TERRITORIES, DEPARTMENT OF THE INTERIOR, by (issuing office) Division of Insular Affairs, Office of Territories, Department of the Interior, Room 6412 Interior Building, Washington 25, D. C. Sealed bids in single copy for furnishing all labor, equipment, and materials and performing all work for the project described herein will be received until 3:00 P.M. Atlantic Standard Time, October 20, 1955, in the Office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands and then publicly opened and read aloud. Information regarding bidding material, bid guarantee, and bonds, plans and specifications and other proposed contract documents are open for public inspection at the office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands; R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama; Lester M. Marx, Room 2713 Interior Building, Washington 25, D. C.; Housing and Home Finance Agency, Room 313 N. Y. Department Store Building, 1064 Ponce de Leon, Santurce, Puerto Rico; A.G.C. Office, 1113 Congress Building, Miami, Florida; Builders Exchange, 46 Northeast 6th Street, Miami, Florida; F. W. Dodge Corporation, 119 West 40th Street, New York 18, N. Y.; and A.G.C. Office at Palm Beach, Florida. Plans and specifications may be procured from the office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama, upon deposit of $20.00. Deposit shall be only by certified check payable to the Treasurer of the United States, which will be refunded to bona fide bidders upon the return of plans and specifications in good condition within thirty (30) calendar days from the date of bid opening. A bona fide bidder includes any person who submits a bid for a general contract, but does not include a person who submits a quotation to the general contract bidders. To persons who procure plans and specifications upon payment of $20.00 and who do not submit a bid, $15.00 will be refunded upon the return thereof, in good condition, within thirty (30) calendar days from the date of bid opening. No refund will be made for return after that time. Bonds, etc.—Each bid must be accompanied by a satisfactory bid guaranty in an amount not less than 5 percent of the total bid. The successful bidder will be required to furnish a performance bond and payment bond, each in the amount of 100 percent of the contract price. No bid may be withdrawn until thirty (30) calendar days after the scheduled closing time for the receipt of bids. The Government reserves the right to waive any informality and to reject any or all bids, when such is in the interest of the Government. Description of Work—The construction of an additional section of the intercepting sewer, paralleling the existing 18-inch V.C. intercepting sewer, or meandering in the same general direction, from the vicinity of NY Tvaer Gade to the Lift Station near the French Village which includes the following approximate quantities: 1 Reinforced Concrete Grit Chamber, 11 Concrete Manholes (0 to 14 depth), 260 Lin. Ft. 8" Pipe (Hauling and Installing Only), 500 Lin. Ft. 10" Pipe (Hauling and Installing Only), 1,070 Lin. Ft. 18" Pipe (Hauling and Installing Only), 440 Lin. Ft. 20" Pipe (Hauling and Installing Only). The cast iron sewer pipe will be furnished at St. Thomas, Virgin Islands from Government surplus. The majority of trench for 18" and 20" sewer will be in dredged fill and the pipe invert will be approximately 6′ to 8′ below sea level in trenches 8′ to 12′ deep.

OFFICIAL PROPOSAL

RATE: $1.80 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, 330 W. 42nd St., New York 36. N. Y.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

NATIONAL COVERAGE

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities....
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

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The advertising rate is $24.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

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$1.80 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

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Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to ENGINEERING NEWS RECORD, 330 W. 42nd St., N. Y. 36, N. Y. for October 13th issue closing October 3rd.

BELT CONVEYOR ENGINEER

Experienced in application and mechanical and structural steel design of belt conveyors and related equipment to bulk materials handling. Excellent opportunity with nationally known manufacturer in Chicago suburban area. Submit resume which will be held confidential.

P-7799, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

BRIDGE ENGINEERS

Civil Graduates of accredited U. S. colleges. Must have not less than the following experience:

Detailers—2 years structural steel or reinforced concrete detailing.

Designers—4 years responsible work on structural steel and concrete including work on long span bridges.

Mail complete resume together with salary required to:

Howard, Needles, Tammen & Bergendoff
55 Liberty Street New York 5, N. Y.

REFINERY CONSTRUCTION SUPERINTENDENT

WANTED

Submit experience record and photograph
California Location

P-7552, Engineering News-Record
1111 Wilshire Blvd., Los Angeles 17, Calif.

CHIEF CHEMIST

degree and experience in chemical testing of construction materials, cement, asphalt, metals by ASTM & AASHO. Knowledge in use of Spectrophometer desirable, not essential. Location, Gulf Coast. Send complete resume and Sale requirements to Box

P-7808, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

STRUCTURAL DESIGNERS

Structural Designers who want greater opportunities and diversified experience are needed by a large, progressive engineering company celebrating its fiftieth year of service to industry.

Permanent Positions for Qualified Personnel
Professional Status
Profit Sharing Retirement Plan
Insurance Benefits
Promotion from Within the Company

Please send resume to:

Director of Personnel
THE RUST ENGINEERING COMPANY
575 Sixth Avenue Pittsburgh 19, Pa.

DESIGN ENGINEERS

Who seek greater earnings and better future opportunities should reply to this advertisement providing they have a minimum of five years experience in heavy structural steel and/or concrete design. Permanent positions.

Here is an opportunity to make full use of your abilities and experiences and receive top earnings.

Our employees know of this advertisement.

Send complete resume to:

P-7820, Engineering News-Record
330 West 42 Street, New York 36, New York

ENGINEERS — DESIGNERS

Chemical - Mechanical - Electrical - Structural - Piping

San Francisco assignment

Recent design experience on petroleum refineries, chemical plants, or related projects. Compensation commensurate with ability. Liberal moving allowances.

Please write furnishing complete chronological experience record and salary history, also full details regarding education, salary desired, businesss and character references.

BECHTEL CORPORATION
220 Bush Street San Francisco 4, Calif.

ENGINEEER-LABORATORY DIRECTOR

degree and supervisory experience required. Advanced soil mechanics degree desirable. Must have experience testing soils, concrete, steel, and general construction materials by standard procedures. Location, Gulf Coast. Send complete resume and salary requirements to Box

P-7809, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

SANITARY ENGINEERS

California offers positions with opportunity for professional advancement. Two years' experience related to treatment and disposal of sewage and industrial waste, plus college engineering degree. Salary $436 to $530. Write today. Dept. A, Recruitment Section, State Personnel Board, 801 Capitol Avenue, Sacramento 14, Calif.

IMPORTANT TEACHING POSITIONS OPEN IN ISRAEL

Technion, Israel Institute of Technology, in Haifa, Israel, proposes to appoint:

- Professor of Structural Engineering
- Professor of Hydraulic Engineering
- Professor of Mechanical Engineering
- Professor of Mechanical Engineering with special qualifications in Applied Thermodynamics
- Professor of Mathematics

Applicants should have first-rate professional and academic qualifications, be willing to integrate themselves into the life of the country and, in due course, to teach in Hebrew.

Applications with full details should be sent in duplicate, for transmission to Haifa, to the:

AMERICAN TECHNION SOCIETY
1000 Fifth Avenue New York 28, N. Y.

EMPLOYMENT OPPORTUNITIES

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Construction Foreman for firm engaged in extensive sewer, water main and treatment plant facilities. Permanent position in N. Y. State area. Only qualified applicants with broad experience. P-6595, Engineering News-Record.

Estimator—Engineering graduate with several years experience in estimating costs of oil refineries and chemical plants for contractor in Chicago area. Submit complete resume and photograph indicating education, experience and salary requirement. Box P-7614, Engineering News-Record, 330 W. 42nd Street, New York 36, N. Y.

Highway and Bridge designers and draftsmen. Positions open for men experienced in the design of highways and bridges. Long established Pennsylvania firm. Steady program of work. Usual employee benefits. Please submit information concerning education, complete experience, references, salary requirements, and availability. P-7615, Engineering News-Record.

Engineers—Experienced in design and preparation of plans for water works and sewerage systems and structural design. Advise education, experience, salary requirements and when available. Location Eastern New York. Reply P-7657, Engineering News-Record.

Architect—Qualified through training and experience to design churches, schools and other buildings. Give full information as to education, experience, salary requirements and when available. Location Eastern New York. P-7658, Engineering News-Record.

Engineer—Experienced at design and detailing of reinforced concrete and structural steel for highway structures. Location, Upper New York State. Please send complete experience record and salary required. P-7660, Engineering News-Record.

Graduate Civil Engineers not over 27 and single, or if married, willing to move. Must have military training completed and interested in learning building construction business. We offer opportunity for rapid advancement to ambitious, hard-working young men willing to accept responsibility. Starting salary $92.50 if unexperienced with higher rates for those with experience. Some engineers increase their salary 20% within one year. Send complete history data. Martin K. Eby Construction Co., Inc., 610 N. Main, Wichita, Kansas.

Wanted, Draftsman or engineering aide for city engineering department. Submit complete resume and salary requirements and earliest date available to City Engineer, City of Owosso, Michigan.

Structural Engineer for building design Ketchum and Konkel, Consulting Engineers, 1090 Fox Street, Denver 4, Colorado.

Superintendents and Foremen for firm utilizing all types of construction equipment. Must have extensive mechanical experience, proven ability to supervise operators and mechanics. Permanent locations, good starting salary and opportunity for advancement. Send complete details of background, experience and salary requirements to: Box P-7624, Engineering News-Record.

Estimator for established firm engaged in the engineering and construction of complete industrial plants. Should have at least five years experience in pricing labor and material on large scale industrial projects. Location, Pittsburgh. Please furnish resume of experience and training. P-7647, Engineering News-Record.

Municipal engineer for the Village of Ossining. General knowledge of water works, sewers, streets. Preparation of plans and specifications, etc. Mail resume with name, address and salary requirements. Ubaldo Marino, 6 Croton Ave., Ossining, New York.

Building Construction Superintendent — Wanted at once for large school project in Cedar Rapids. Must be well qualified and experienced. Project duration approximately two (2) years. Position permanent for right man. Write stating qualifications, habits, experience, previous employment, references, availability, and salary expected. Address reply to R. F. Ball Construction Company, Inc., Post Office Box 2300, San Antonio, Texas.

POSITIONS VACANT

Sales Engineer, with structural training for sales promotion of precast concrete building products in Western New York, calling on architects, engineers, contractors, for well known and long established firm. Write giving full qualifications, experience, and salary expected. P-7722, Engineering News-Record.

Connecticut Contractor, specializing in commercial and industrial building construction, looking for competent estimator, engineering background required. Must have extensive experience and be capable of assuming complete charge upon the eventual retirement of top official. Reply P. O. Box 1059, New Haven, Conn.

Experienced structural designers and detailers for work on reinforced concrete and steel highway structures with consulting engineers. Please give age, qualifications and salary requirements in reply. P-7462, Engineering News-Record.

Construction Superintendent—Engineer Govt. work. New organization desires to supplement key personnel. Opportunity for right person. Replies will be held in confidence. P-7766, Engineering News-Record.

Civil Engineer—For plan engineer position. Duties include sewer and water main design and field work. Salary range $385 to $460 per month. Apply City Engineer, City Hall, South Milwaukee, Wisconsin.

Engineer, Under 30, with experience in the design of heavy equipment installation and maintenance. Excellent opportunity for advancement with growing Southeastern division of national manufacturer of packaging materials. Now employ 600 with 500% expansion contemplated during next 10 years. Mechanical or civil engineering degree preferred. Starting salary to $6500, depending upon qualifications. Permanent position in small southern community. Send complete resume to P-7801, Engineering News-Record.

Wanted recent civil or mechanical engineering graduates, general field municipal water supply. Annual increase in salary and bonus. Profit sharing plan. Pitometer Associates, Engineers, 50 Church Street, New York City.

Wanted: Civil Engineer to serve as Assistant Town Engineer. Municipal experience desirable. Salary $5500.00. Wanted Civil Engineer. Recent graduate for municipal work. Salary $4500.00. Apply Town Engineer, Town of Fairfield 608 Jennings Rd., Fairfield, Connecticut.

Engineer, C.E.—Experienced. Shoring, underpinning, foundation. For supervising and estimating. N. Y. Area. P-7812, Engineering News-Record.

Engineers — Aeronautical (structures and power plant), civil, electronic—The Civil Aeronautics Administration urgently needs engineers to conduct development, applied research, experimentation, evaluation and testing programs and projects on electronic and other aids to air navigation, communication and traffic control; airport surfacing; aircraft structures, powerplants, instruments, appliances, safety devices and other components; and aircraft flight analysis, instrumentation and methods. Salaries range from $4345 to $7570 per year. Write or send application or Standard form 57, which can be obtained at your Post Office, to Personnel Officer, Civil Aeronautics Administration, Technical Development and Evaluation Center, P. O. Box 5767, Indianapolis, Indiana.

Position open for Chemical Engineer, 25-35 years of age, in branch operation of medium-sized company engaged in non-metallic mining, refining and processing. Must be capable of assisting the plant superintendent in all phases of the operation. Experience in both production supervision and pilot plant work not essential, but considered to be good background for this position. Considerable opportunity exists for capable, aggressive person. Salary open. Location Southwest U.S.A. P-7824, Engineering News-Record.

Draftsman—structural steel detailing experience. For interview send resume and salary requirement to Carl Wilsberg, Ch. Eng., The Standard Structural Steel Co., Box D, Station A—Hartford, Conn.

SELLING OPPORTUNITY OFFERED

Salesman, construction equipment, have exclusive New York City territory for one of leading dealers. Extensive experience necessary. RW-7721, Engineering News-Record.

POSITIONS WANTED

Civil Engineer, B.S.C.E. '54. Desires to relocate East or West coast with fabricator, contractor or consultant. Age 31, married. PW-7751, Engineering News-Record.

Civil Engineer—33, B.C.E. 6 years experience in steel erection and design. Have had responsible assignments in structural, plate, and pipe work, heavy machine installation and steel plant construction. PW-7715, Engineering News-Record.

Executive—Office Manager—18 years with heavy construction contractor, main office. Thoroughly experienced in all phases of office procedure—finance, insurance, payrolls, etc. A1 business and character references. Interested in connecting with progressive organization. New York Metropolitan Area. PW-7640, Engineering News-Record.

Superintendent—Maintenance 27 years experience in firebrick & chemical brick construction desires position in Western states. Oil refinery, chemical plant or steel plant. Apply to PW-7701, Engineering News-Record.

Bridge and Highway Engineer desires foreign position involving wide responsibilities. Thoroughly experienced in design, construction and supervision, possesses knowledge of many languages and ability to organize and train foreign personnel such as detailers, draftsmen etc. At present employed with large New York Consulting firm on foreign project. Available immediately. Request A. P. 862, San Salvador, Central America.

Civil Engineer—30—B.S.C.E. Seven years contractors man—large scale concreting bridge erection—docks—bridge piers in major rivers and deep cofferdams—also structural design experience and P.E. Well qualified for position as assistant superintendent, project manager or contractors walking boss. Can become estimator with short training period. Resume available. PW-7830, Engineering News-Record.

Mechanical Engineer field maintenance 10 years experience with exploitation, estimation of costs repairs of heavy construction equipment, concrete & earthmoving, aged 33, 5 languages, go anywhere. PW-7813, Engineering News-Record.

C.E. Age 41, experienced every phase building construction, heavy construction and management. Highest references. Available immediately. Location N. J. or Metropolitan N. Y. PW-7775, Engineering News-Record.

Civil Engineer, 30 yrs. sewerage systems, building layout, municipal and highway, desires position in New England or New York. Box PW-7776, Engineering News-Record.

Registered Civil & Structural Engineer in California. Experience of responsible charge in the design of bridges and buildings of all types. Desires managerial position in San Francisco Bay area. PW-7777, Engineering News-Record.

Building Construction Engineer, experienced banks, hospitals, office buildings new and alterations. Check estimates coordinate self-contractors, negotiate contracts. PW-7806, Engineering News-Record.

SELLING OPPORTUNITY WANTED

National sales organization wants additional line of products to sell heavy equipment operators and dealers. Reply SA-7177, Engineering News-Record.

Your inquiry
will have
Special Value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

STRUCTURAL ENGINEERS

Having experience with heavy material handling equipment

Permanent Position
For Qualified Men

HOSPITALIZATION
INSURANCE
VACATION

Phone or Write
Chief Engineer for interview

THE WELLMAN ENGINEERING CO.

7000 CENTRAL AVE.
Cleveland 4, Ohio
Telephone EN 1-0842

WANTED

SUPERVISOR

OF CONTRACTOR'S EQUIPMENT

Replacement value approximately $2,000,000. Must have practical experience in proper use, care, maintenance and repair of all types of construction equipment. Will be required to maintain equipment records. Good opportunity with well established Midwestern firm which operates in about 12 states west of Mississippi River. Home Office in Lincoln, Nebraska.

Write full details as to qualifications, personal information, references, and salary required. Applications will be held confidential if desired.

P-7746, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

FOREIGN AIRBASE

Immediate openings for

ARCHITECTURAL
MECHANICAL
HIGHWAY-AIRFIELD
DESIGN ENGINEERS

ESTIMATORS &
DRAFTING SUPERVISORS

Must have degree (or equivalent) plus 6-10 years specialized exp.

MIN. TO $11,000 + OVERTIME

Airmail resume to

P-7757, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

ENGINEERS and DRAFTSMEN

Civil, Electrical, and Mechanical to work on large hydroelectric, irrigation, and multiple purpose projects. Good starting salary, liberal employee benefits. Please send complete resume and salary desired to

HARZA ENGINEERING COMPANY
400 West Madison St. Chicago 6, Ill.

EMPLOYMENT OPPORTUNITIES
POSITIONS VACANT

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P-7807, Engineering News-Record
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CHICAGO: 520 N. Michigan Ave. (11)
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WANTED
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also
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Murdock 6-6600

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W-7711, Engineering News-Record
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W-7800, Engineering News-Record
520 No. Michigan Ave., Chicago 11, Ill.

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3-Caterpillar DW 10's

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400 H.P., 588 RPM.	1200 H.P., 444 RPM.

2200 Volt, A.C. with controls.

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NASSAU, NEW YORK

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955 P & H 85' boom, 2½ yard diesel dragline
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FS-7805, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

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Excellent Condition—Real Bargain

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If you don't see what you want—ask for it. Ask the advertisers. They are constantly adding to their stocks and may have acquired just what you need.

And, when you have special items to dispose of, use the Searchlight Section of Engineering News-Record to help you locate buyers. . . . Send a list of your equipment and we will gladly give full information as to space and rates.

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330 West 42nd St. • New York 36, N. Y.

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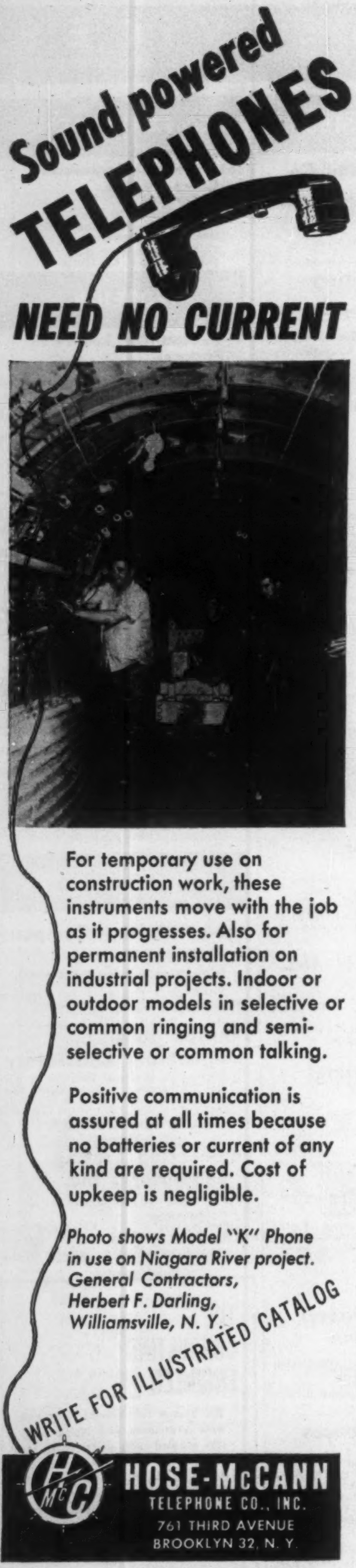

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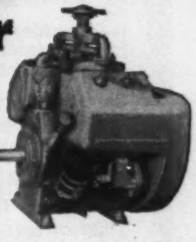

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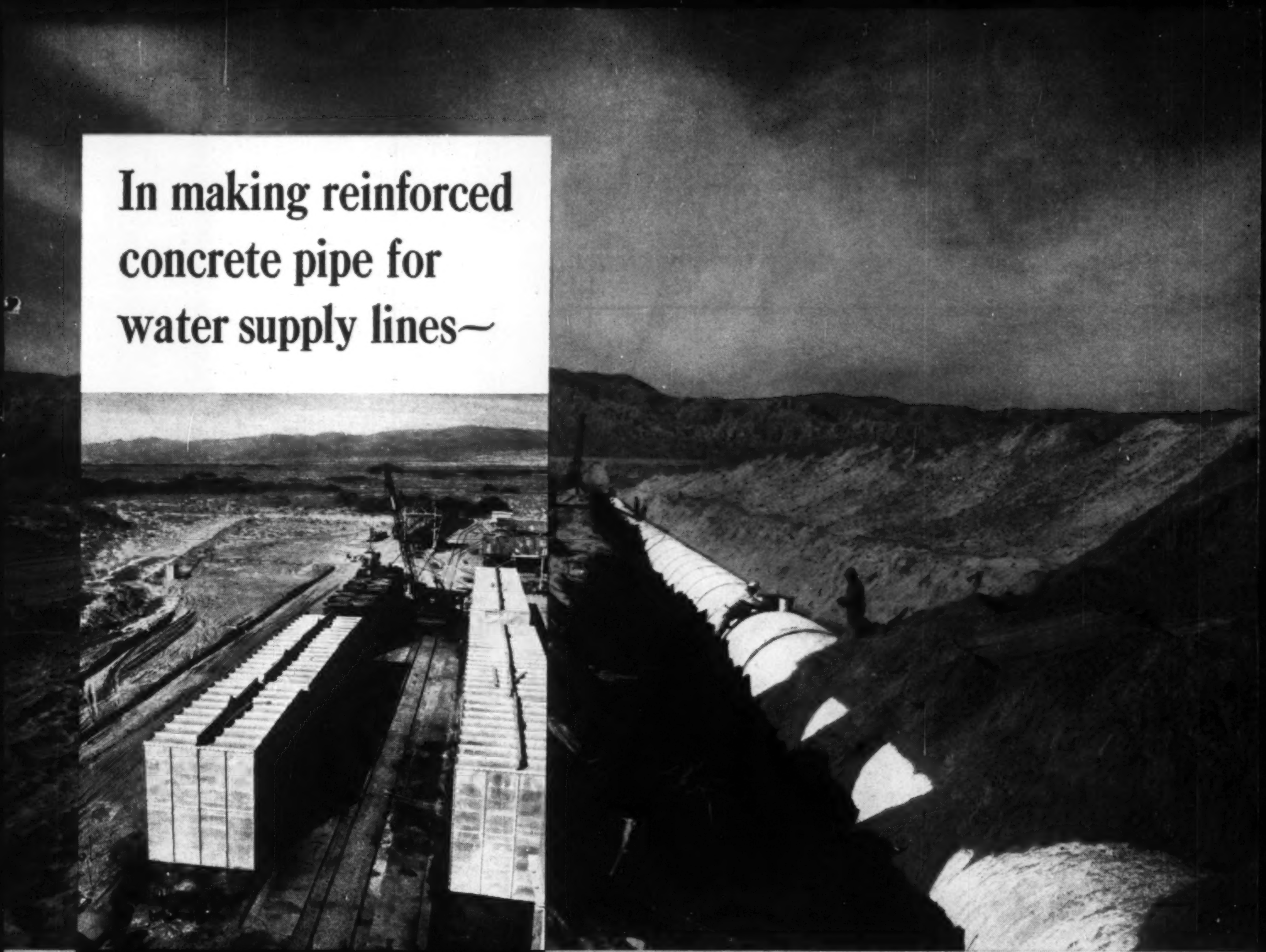

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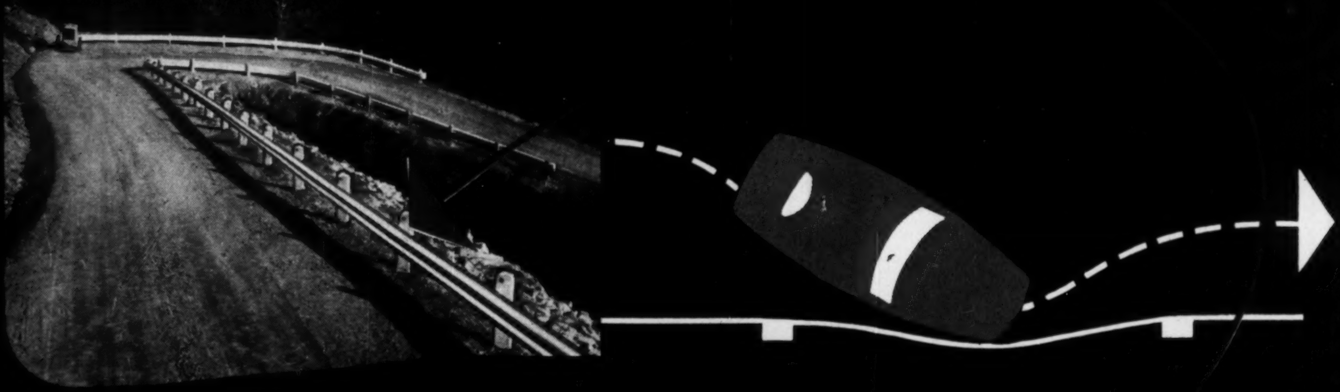

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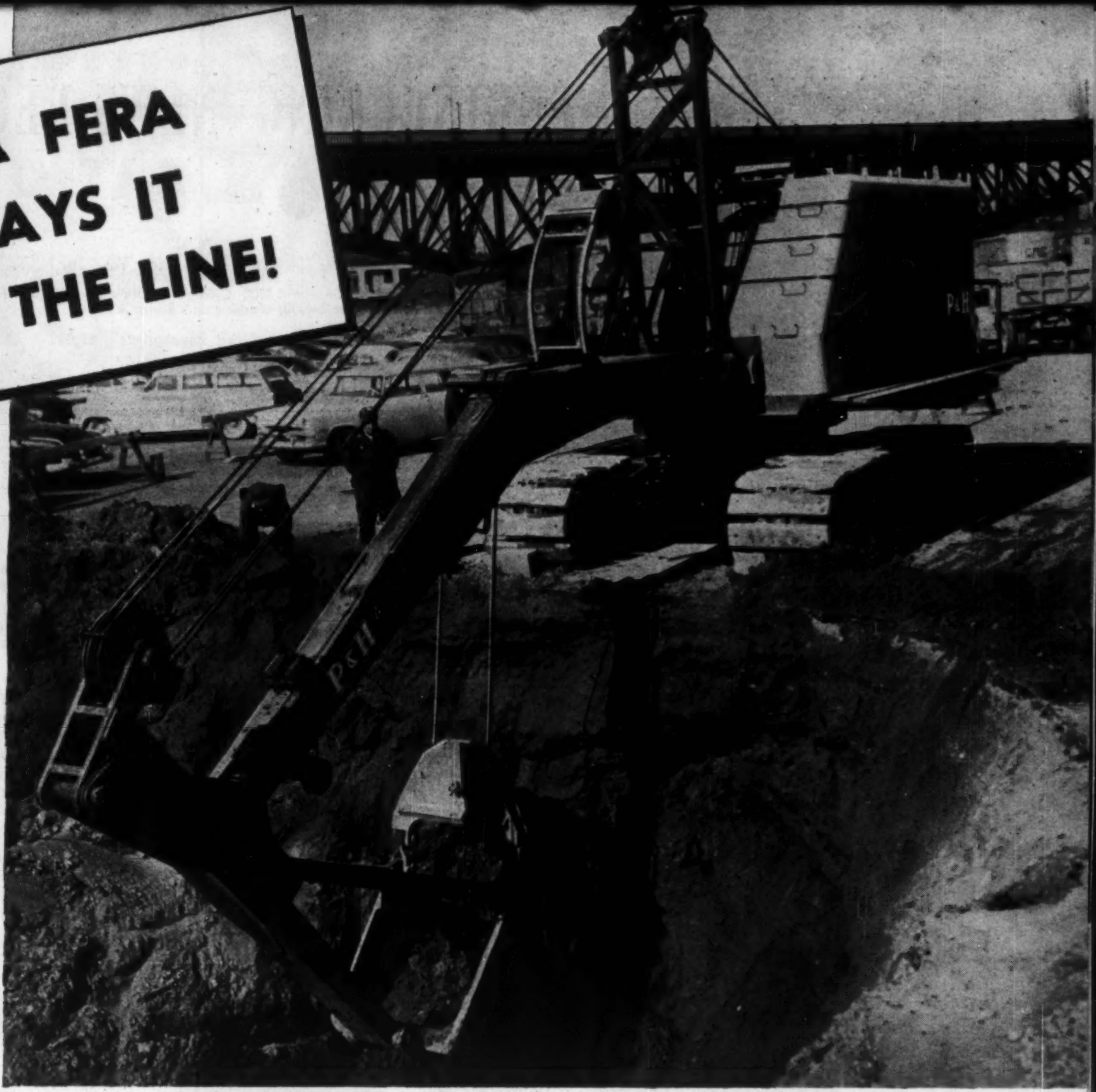

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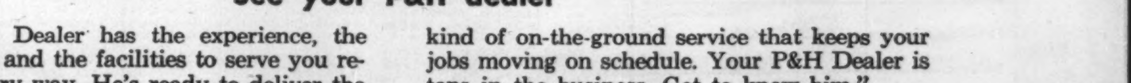

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Robert F. Boger
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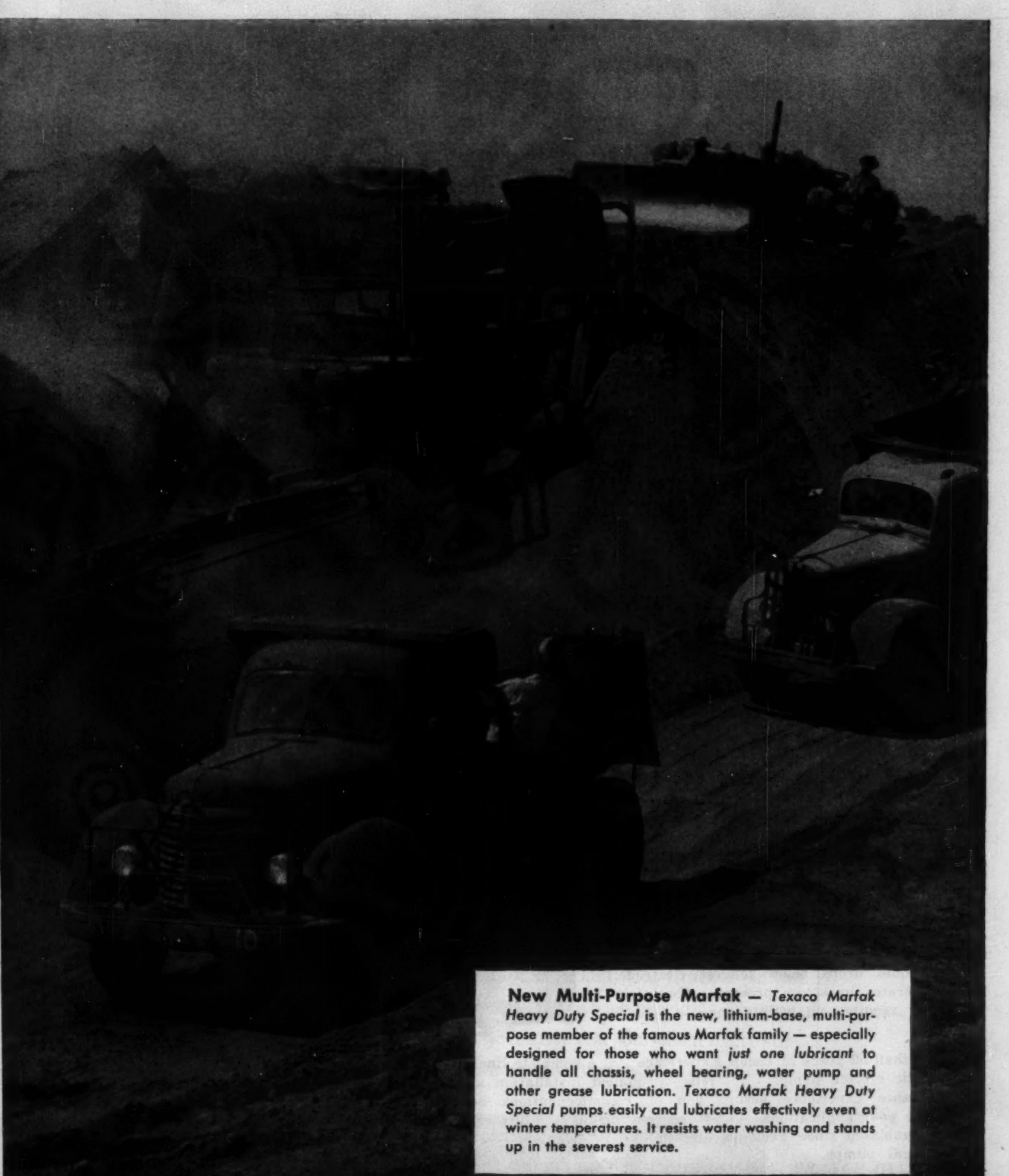

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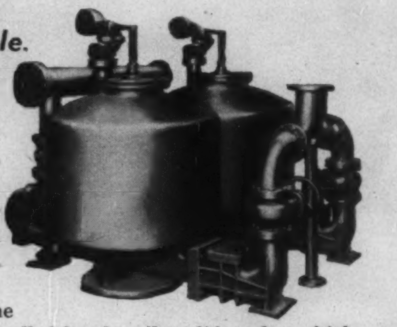

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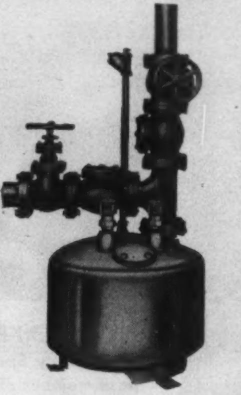

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READER COMMENT

Better Architects

SIR: The editorial "Better Architects, Better Building", (ENR Sept. 22, 1955, p. 64) prompts me to state my belief that the colleges are turning out architects who think only in terms of very modern style. They are not at all familiar with the traditional—are not very flexible. Most of them want to be in business for themselves; they do not seem to be willing to get in an organization, roll up their sleeves and make working drawings for a number of years so that they really will learn something.

What we really need are plain ordinary architectural draftsmen, not college trained architects, as there are plenty of them. There should be some sort of a trade school movement where we could train men in construction draftsmanship. For many years the trade schools have been training people in mechanical drafting for machine work and are doing a good job. I am certain that they could do the same in training architectural draftsmen.

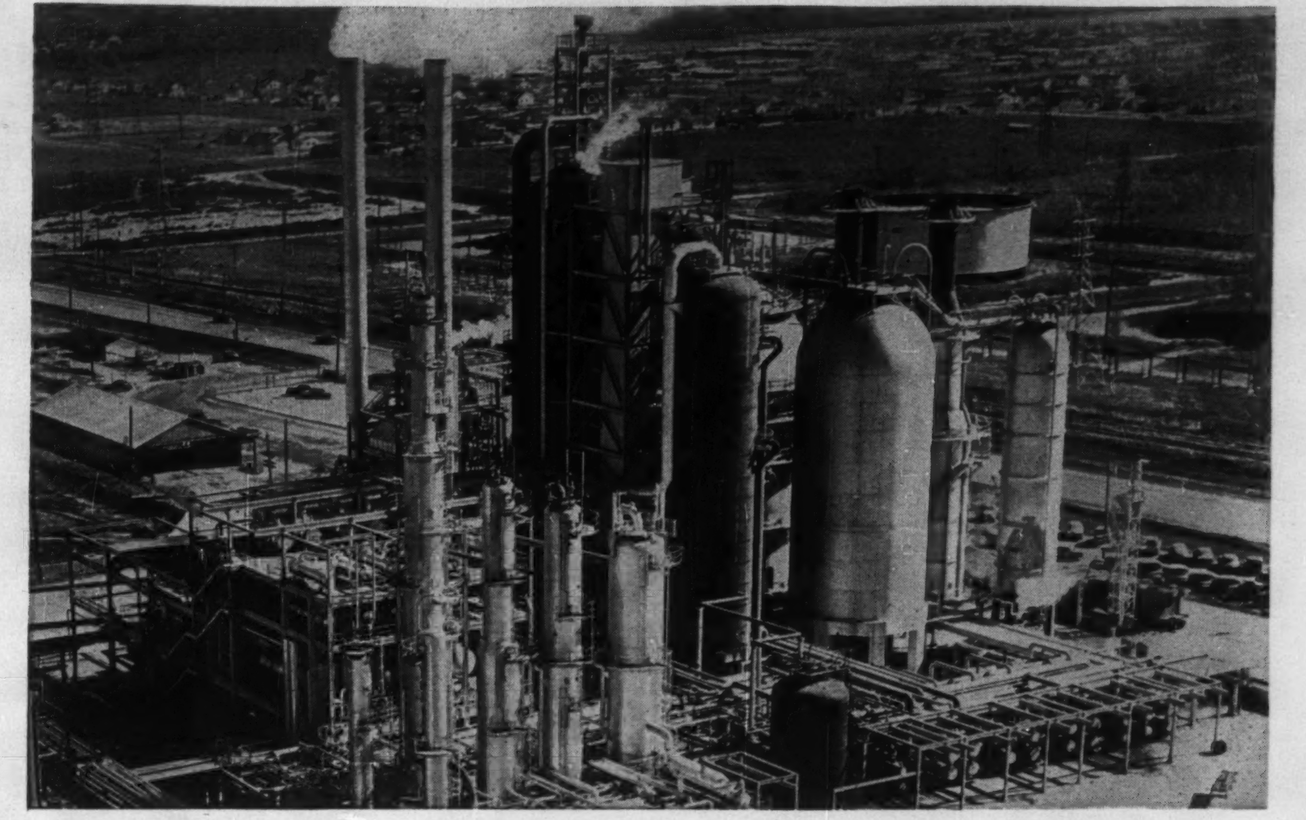
LEO F. CAPRONI
Caproni Associates,
Architects & Engineers
New Haven, Conn.

Engineer Grads

SIR: An engineer student usually receives sufficient basic education in school to enable him to develop rapidly thereafter into a highly useful and valuable member of an engineering organization. Upon graduation, however, many young engineers are confronted suddenly with the necessity of performing monotonous and narrow types of technical work. Justifiably, many are disappointed with the prospect of a dull and comparatively poorly paid future in engineering. If they have a flare for sales or other more interesting and profitable fields of endeavor, they gradually move into positions either not closely related to professional engineering work or fields with no engineering connection whatsoever. At least one-half of the engineers I have known intimately have followed this trend away from technical work.

My own judgment and experience indicate that it is a good long-term investment to assign and train technical personnel so that they will take more interest in their work and be able to perform varied functions. Very few engineers seem to want to leave an organization operating under this principle. The benefits to the employers

(*Continued on page* 10)



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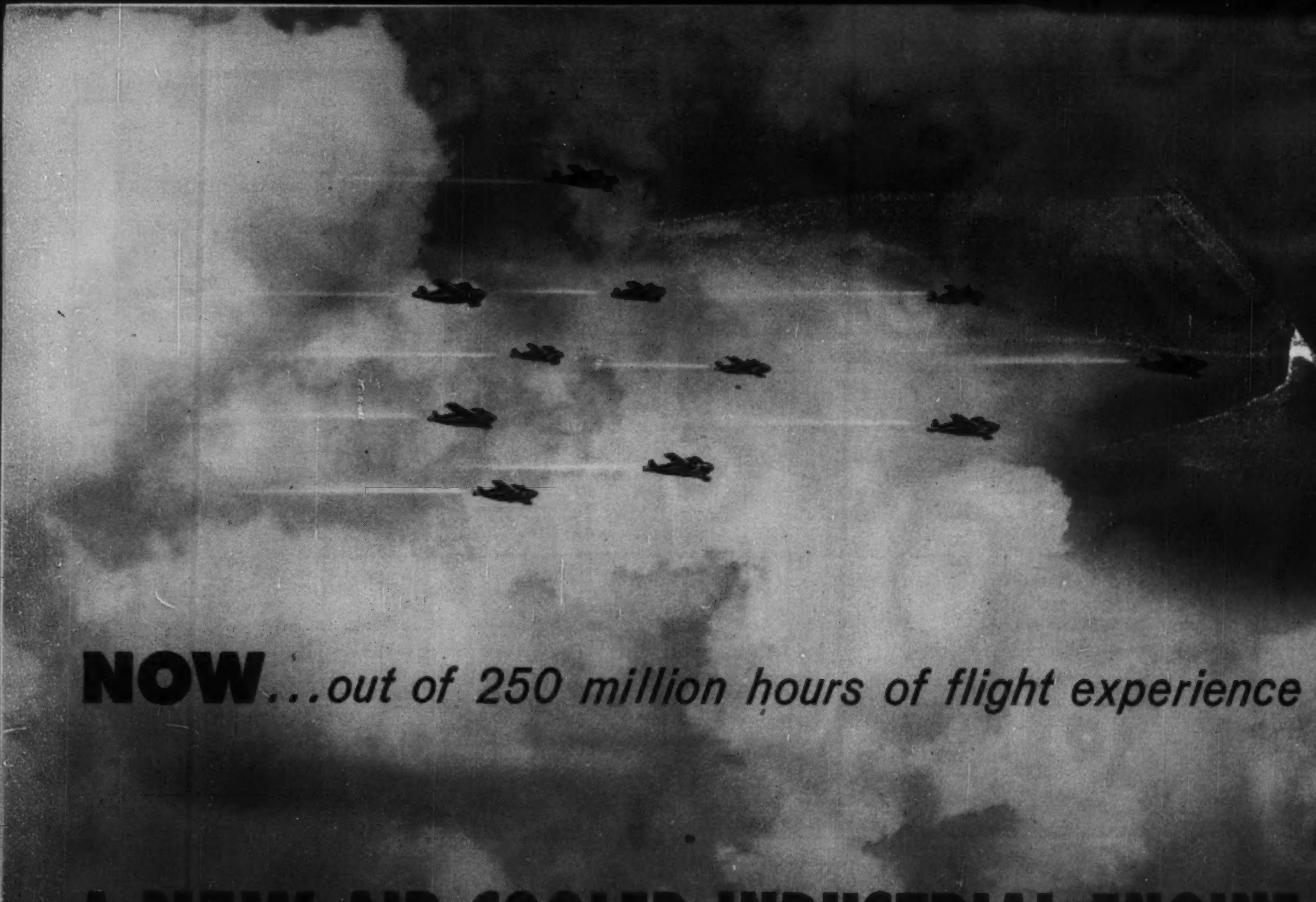

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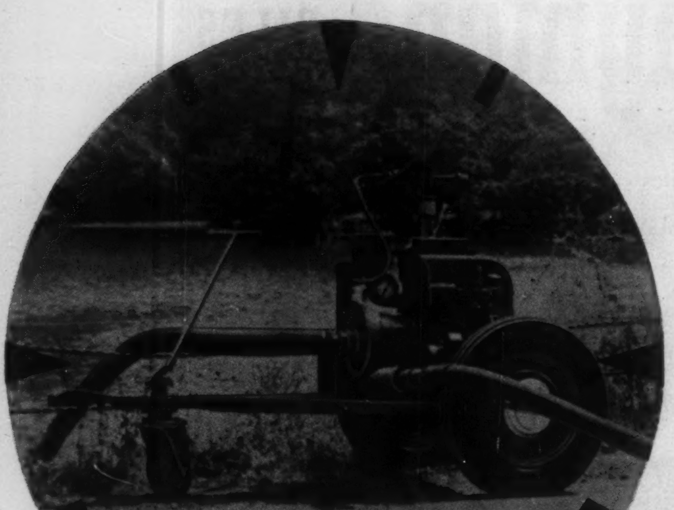

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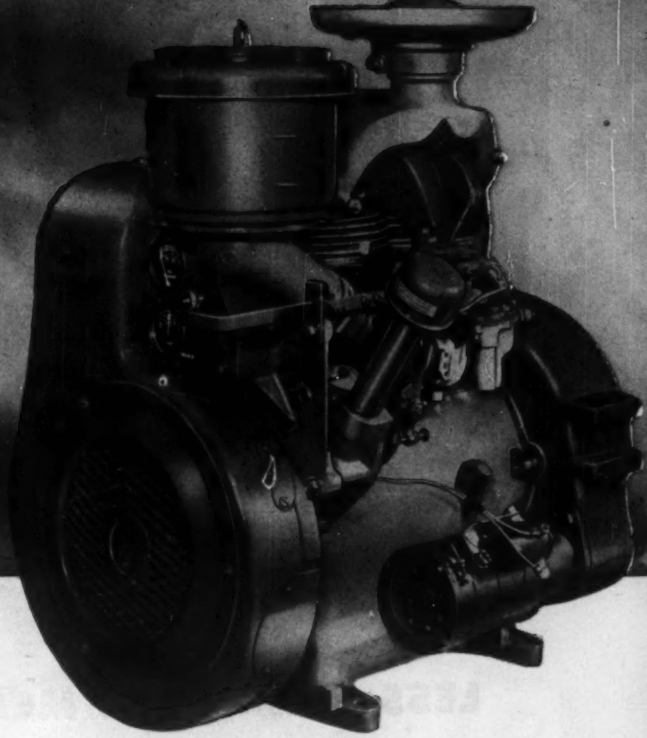

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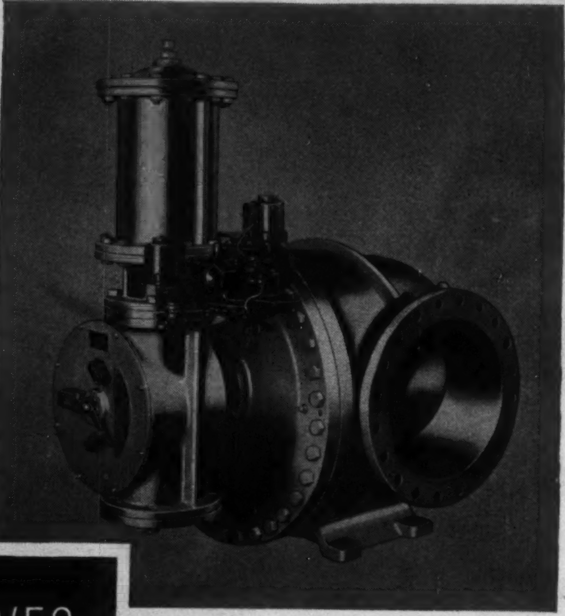

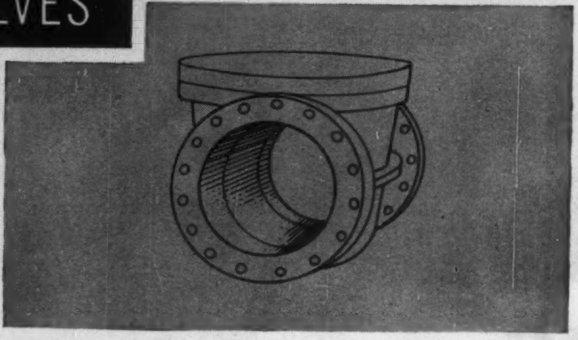

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READER COMMENT

are less men to train and increased production due to better morale. A fair system of profit sharing and/or systematic program of promotion are further factors resulting in less turnover and better work attitude.

Inasmuch as a large percentage of young people appear to prefer technical work of an interesting nature to other ways of earning a livelihood, the real answer to a shortage of technical workers is the institution of management practices which will result in maintaining their interest; also provide somewhat equal pay and equal chances for advancement to what are available in other fields of endeavor. The reason for a shortage is definitely not basic aversion to technical work. A surprisingly large proportion of youngsters talk about their ambitions to be "big engineers."

George O. Consoer
Consoer, Townsend and Associates
Consulting Engineers
Chicago, Ill.

Correction—Incinerator Story

An unintended puzzle confronted readers of the article "Incinerator Meets Strict Tests" in our issue of Sept. 22, 1955 because the last half of the article appears on page 24 and the first half on page 25, instead of vice versa. This error in makeup, which never should have happened but did, requires that the reader begin the article with the last paragraph in the first column on page 25, read the next column on page 25 and then return to page 24 to complete the story.

CALENDAR

International Road Congress, Dolmabahce and Yilditz Palaces, Istanbul, Turkey, Sept. 26-Oct. 16.

First National Prestressed Concrete Short Course, Maritime Base, St. Petersburg, Fla., Oct. 10-12.

Federation of Sewage & Industrial Wastes Associations, Ambassador Hotel, Atlantic City, N. J., Oct. 10-13.

National Society of Professional Engineers, fall meeting, Peabody Hotel, Memphis, Tenn., Oct. 14-15.

Southeastern Association of State Highway Officials, annual convention, Charleston, W. Va., Oct. 17-19.

National Safety Council, annual meeting, Conrad Hilton Hotel, Chicago, Ill., Oct. 17-21; construction section, Oct. 17-18.

First Western Conference on Asphalt in Hydraulics, University of Utah, Salt Lake City, Utah, Oct. 19-20.

National Council of State Boards of Engineering Examiners, annual meeting, Sheraton-Park Hotel, Washington, D. C., Oct. 20-22.

Institute of Traffic Engineers, annual meeting, William Penn Hotel, Pittsburgh, Pa., Oct. 23-27.

American Society of Civil Engineers, annual meeting, Statler Hotel, New York City, Oct. 24-28.

California Section, American Water Works Association, meeting, Memorial Auditorium, Sacramento, Calif., Oct. 25-28.

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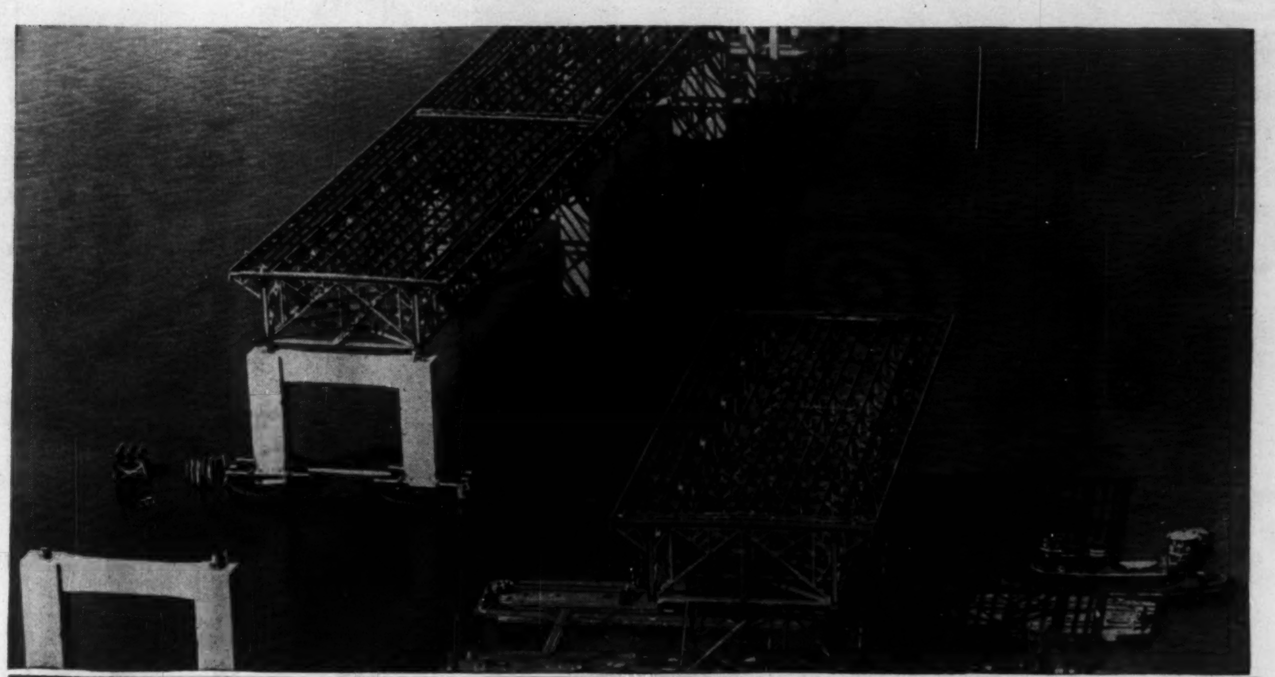

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ONE OF THE important links of the New York-Buffalo New York State Thruway is the $60-million Hudson River Bridge between Tarrytown and South Nyack, N.Y., which is to be ready for use later this year. This important portion of this new highway comprises nineteen 250-foot units, such as those shown above, and a 1,212-foot main span and 602-foot side spans for a main-channel cantilever bridge. Spans for this bridge are being fabricated and erected by the American Bridge Division, United States Steel Company.

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

PREVAILING WAGE ISSUES—AGC officials, attending mid-year policy board meetings in Minneapolis, indicated continued concern over the federal government's "prevailing wage" policies (page 21). They warned of efforts to incorporate Davis-Bacon Act provisions in new highway legislation; reiterated objections to TVA labor agreements; and noted gains made in the safety program.

Meanwhile, in Florida, contractors were fighting labor's contention that the new state "prevailing wage" law intends that union wage scales be used for wage determinations (page 106).

ENGINEERS' LABOR PROBLEM—Consulting engineers also had a controversial labor matter to think about this week. The National Society of Professional Engineers asked the U. S. Supreme Court to overturn a decision holding a consulting engineer's staff subject to the Fair Labor Standards (wage-hour) Act (page 106).

A BIG GAP FILED—The Bureau of Public Roads has complete its overall designation of the nation's interstate highway system by approving the general location of 2,300 mi of highways in and around 102 urban centers (page 23). This will put vitally-needed urban road connections in line for the increased federal assistance that will be afforded the interstate system by whatever "grand plan" for highway aid the next session of Congress may finally settle on.

A NEW LOOK AT SLUM CLEARANCE—A House subcommittee was scheduled to meet in New York City this week for the first of a series of hearings designed to find out why slum-clearance programs have bogged down (page 26).

Main object of the inquiry is Sec. 220 of the Housing Act of 1954 providing for loan insurance on housing built in slum-cleared areas. Not even FHA had been willing in the past to insure such loans, and despite Sec. 220 FHA still has not made a single commitment.

NOW UP TO THE VOTERS—After two years of legislative wrangling over where to locate the reservoirs for a major expansion of New Jersey's water supply system, action finally has been taken that will put the program up for November referendum (page 22.)

ATOMIC AGE TIDBIT—Spokane County Engineer Clyde J. Chaffins complains that eager-beaver prospectors have been hacking holes in county roads and have been leaving rock debris on roadways after blasting roadside claims.

He acknowledges that it's legal to stake claims over county roads, but warns that any Geiger-counting prospector caught damaging a road surface is going to have to clean up his mess—and pay for repairs.

WATER... guardian of the city

From earliest times, mankind has recognized water as the guardian of its safety. The medieval castle relied on its water-filled moat to discourage attack. Today, water is still man's first line of defense against disease and fire.

The vital pipelines which form this first line of defense are the prime concern of farsighted water works officials. More and more of them are turning to LOCK JOINT CONCRETE PRESSURE PIPE on the basis of time-tested performance. The danger of crippling the city's water supply and sanitary facilities through burst or ruptured pipe does not exist in Lock Joint pipelines. The pipe's initial high carrying capacity is permanent, assuring ample water and pressure to combat the hazards of fire.

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WASHINGTON OBSERVER

Eisenhower's importance to federal public works programs can hardly be overestimated. Federal policies important to construction are being surveyed to see what's ahead.

Eisenhower backed programs to pump billions into new public works. His prestige has been behind big construction programs in all the important categories: highways, reclamation, housing, military bases, and the like.

Perhaps most important though is his creation of a Republican philosophy that gives the GOP political and economic justifications for big public works programs.

●

"Partnership" is the key to this philosophy. Under this concept federal agencies should not dominate, but should be the partner of the states and private enterprise wherever possible in developing and carrying out public works programs.

The Administration backs public works to keep the country growing. The theory is that failure to keep highways, water development, housing and the like in line with the country's vast growth in population and living standards could be a brake on our prosperity. In effect, the Eisenhower men say: These public works are absolutely necessary; they're no longer to be considered either as "pork barrel" or pump-priming.

By getting localities and private enterprise to shoulder more of the financing burden, the Administration hopes to step up construction of urgently needed public works for which federal funds might not be available for years to come.

●

Here's how the big construction programs shape up in the new political situation brought on by Eisenhower's illness.

Highways: The Administration still is trying to find its way between conflicting proposals on how to finance the multi-billion highway building program put to Congress this year. Eisenhower's backing could mean everything when the chips are down. The Administration is, of course, completely committed to getting the roads built.

Military construction: Programs here will be cut back little, if at all.

Water resources: With or without Eisenhower, the Administration will continue to back big programs—Upper Colorado, for instance, and other western reclamation and power dams. In the last year or so, new starts have been backed in significant numbers.

Housing: He has backed public housing, and also created new programs to give private builders government help to build in blighted areas. Credit tightening is being applied to prevent a boom-and-bust situation from arising. Officials are completely committed, however, to keep starts at present high levels, they want no real downturn.

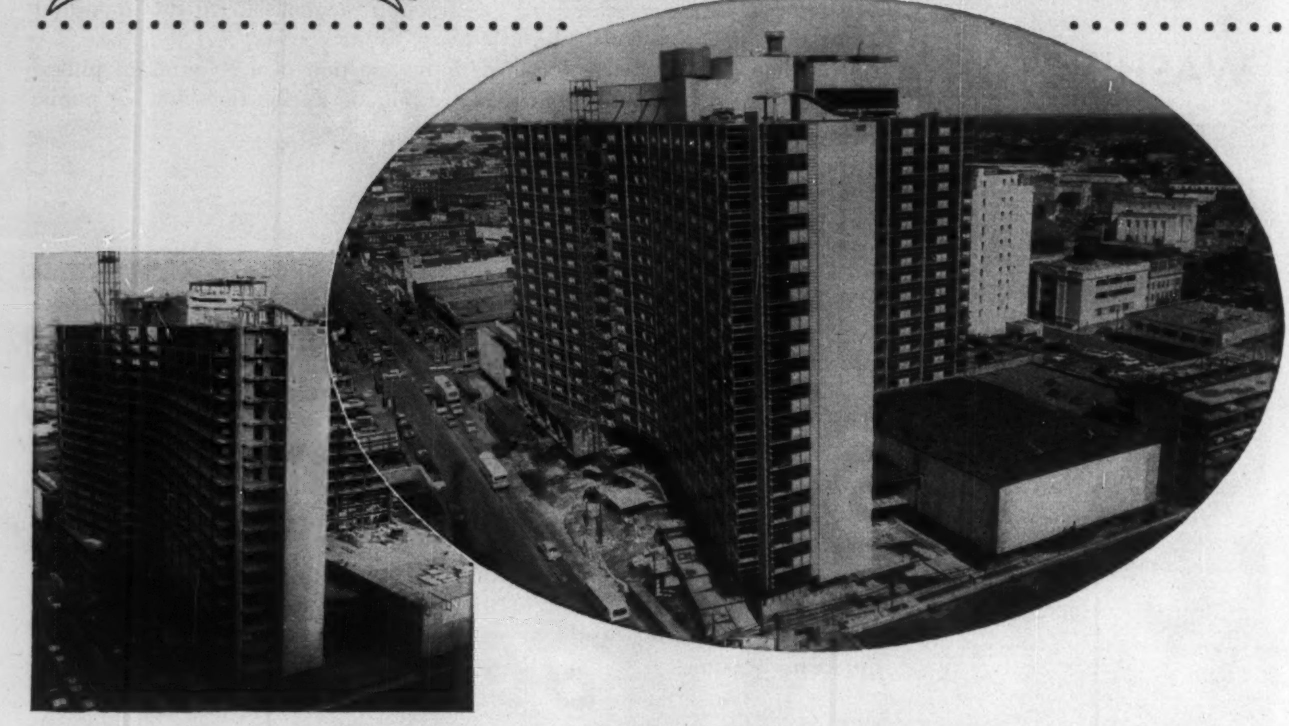
●

Eisenhower's insistence on thorough staff work will mean a lot during the months just ahead. This can help to keep significant conflicts inside the official team from arising during this period.

However, in another 10 weeks or so key decisions have to be made. The budget for the year beginning next July 1 will have to be wrapped up, for instance. Last word on the plans for spending of billions can only be made by a President; his is the authority that can say to a Cabinet officer, "This much you get, and no more."

AROUND THE WORLD

Hilton Makes Hotel History

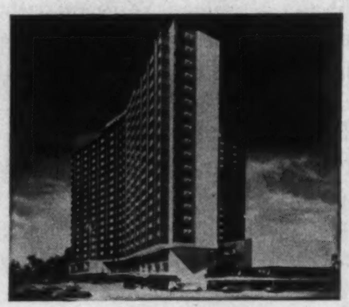


Ingenious Design Cuts Construction Costs on Dallas' 1001-Room Statler-Hilton

● Soon to open in Dallas, Texas, is the luxurious 18-story Statler-Hilton, one of the largest hotels built in 25 years, and latest in the group of 28 hotels welded together by Conrad N. Hilton into the world's greatest hotel organization.

Construction cost of this 1001-room hotel was $9,350. per room ($1.54 per cu. ft.), against an $11,000-per-room average for other new hotels in the system. The reinforced-concrete structural system not only saved money but contributed to the esthetic and functional development of the design.

Of flat-plate construction, the building is T-shaped, with three wings, each about 156 ft. long and 48 ft. wide, radiating from a central core. There are only two longitudinal rows of columns in each wing, with floors cantilevered 10 ft. beyond column centerlines to support the sandwich-panel walls. Floor slabs are 8 in. thick; no drop panels or column capitals used; only painting was required.



In this latest example of the advantages of reinforced-concrete frame construction, a total of 48,305 bbls. of Lone Star Cement was used. Equally proud is Lone Star of the part its products have played in other famous Hilton Hotels—the Waldorf-Astoria, the Shamrock-Hilton, Houston, and the new Statler-Hilton, Hartford, Conn.

As is so often the case, quality has a way of attracting quality.

THE STATLER-HILTON HOTEL, Dallas, Texas
Owner: **HILTON HOTELS CORPORATION**
Architect: **WILLIAM B. TABLER**, New York

Contractor:
ROBERT E. McKEE GENERAL CONTRACTOR, INC.
Dallas, Texas

Structural Engineers:
SEELYE, STEVENSON, VALUE & KNECHT, New York

Mechanical Engineers:
JAROS, BAUM & BOLLES, New York

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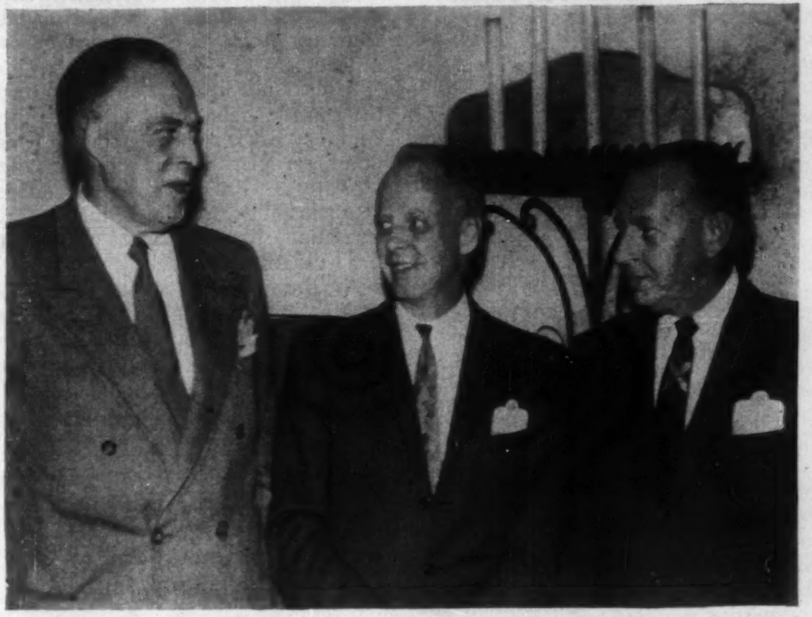


Ray V. Johnson, of Winston Bros. Co., serving as president of the Minnesota AGC, host chapter for the meeting, extends a welcome to incumbent AGC president George C. Koss, of Koss Construction Co., Des Moines, Iowa, center, and the man nominated as his successor, Frank J. Rooney, of Frank J. Rooney, Inc., Miami, Fla. Election of officers will be held at the AGC annual meeting in New York in February.

AGC officials meeting in Minneapolis hear construction forecast . . .

Work Pouring In, Costs Rising, Bidding Rough

For the next six months, the construction boom will continue in high gear, competition for jobs will continue to be tough, steel and cement deliveries will be slow and materials prices probably will go up.

That's the report given to the governing and advisory boards of the Associated General Contractors at a midyear executive meeting in Minneapolis last week.

For the most part, a spirit of confidence and optimism prevailed at the meetings, sparked by the AGC's midyear report on the construction outlook. After checking with AGC's 84 directors and 124 chapters, H. E. Foreman, managing director, told association officials:

"Both immediate and long-range prospects are for a continued volume of construction at record levels. With new construction volume for the first eight months of this year running 13% ahead of the same period last year, new construction for 1955 is expected to reach $42 billion . . . $4 billion above last year. And, when you include maintenance and repair, you get a total volume of construction activity for 1955 of $58 billion."

• **Tough competition**—The outlook for construction volume was encouraging for the next half year. The consensus was that there would be "a steady surge toward a new, record-breaking volume of construction, with exceedingly intense competition. . . ."

"Cocktail caucuses" at the meeting made it clear that the tough bidding competition which has prevailed for more than a year is here to stay for a while longer.

In addition to the bid competition and the prospect of higher materials prices before February, the AGC spotted some other clouds on the horizon. Officials at the session cast an anxious eye on some thorny legislative proposals affecting general contractors' relations with labor and subcontractors.

• **Bid-shopping**—So-called "bid-shopping" legislation is probably the prime problem of all general contractors today. Adoption of Senate Bill 1644 on the closing day of the last session is viewed by the AGC as an opening wedge in a concerted drive to destroy the single-contract method of construction.

The bill would require a general contractor to list the names of his proposed mechanical specialty subcontractors in his bids on federal public works contracts.

• **Oppose Davis-Bacon**—AGC's Labor Committee wants no part of the Davis-Bacon Act in any forthcoming highway legislation. It intends to keep a wary eye on any developments and to resist adoption of any direct amendments to the act affecting wages, working conditions, welfare payments and other provisions that would, in effect, permit the federal government to change wage requirements after a contract has been awarded.

In another resolution, AGC reinforced its stand of being opposed to TVA—or any other government agency—negotiating labor agreements for construction. The resolution also brought up a long-time sore point—TVA should abide by agreements negotiated by the proper bargaining agencies (i.e., contractors' groups) in the Tennessee Valley area.

• **Accident prevention**—Safety was also a hot topic at the meetings.

AGC officials feel dividends are being reaped already because of the new drive for safety, particularly in better public relations, improved workmen's morale and reduced rates for workmen's compensation in some areas.

• **Engineers wanted**—If there was ever a doubt of the importance of civil engineers to contractors, it was dispelled in an AGC education committee report. Based on a current survey of AGC members on their future needs for civil engineers, the report showed: Roughly 800 AGC member firms reported they now employ a total of 4,000 civil engineers. They must increase this number to 5,660 within the next three years and build it up to 6,500 by 1960.

Water Supply

N. J. legislature approves $100-million bond issue to go on November ballot

New Jersey residents will vote at the November 8 general election on a $100-million state bond issue to finance a major expansion of the state's water supply.

After almost two years of disagreement, the legislature passed a bill authorizing expenditure of $100 million for huge new reservoirs in both north and south Jersey—if the voters approve. Gov. Robert Meyner signed the bill last week.

The new law earmarks $60 million for construction of a reservoir at Chimney Rock in Somerset County, to supply more water for north Jersey residents, and $40 million for development of a water supply on the Wharton Tract in south Jersey's Burlington, Camden and Atlantic Counties.

A companion measure sets up a State Water Development Board in the Department of Conservation and Economic Development to supervise the entire water program.

• **Planned in stages**—The $60 million earmarked for the Chimney Rock project would pay for only the first stage of development. Engineers estimated this would make 70 mgd available by 1960 from the Delaware and Raritan Rivers.

A second stage could be completed over an additional five-year period. This stage would boost the total cost of the reservoir and transmission lines to an estimated $103 million and would provide an estimated 200 mgd. However, this 200 mgd figure for Chimney Rock has been questioned by Meyner and Joseph E. McLean, State Commissioner of Conservation and Development. They contend that Chimney Rock would supply a maximum of 150 mgd.

The water supply question has been a hot political issue in New Jersey for more than two years. While there has been almost complete unanimity on the need for new water supplies, there have been wide differences of opinion on how the supplies should be developed.

Originally, Gov. Meyner's Democratic administration favored construction of a reservoir at Round Valley in Hunterdon County to provide the new water supply needed for north Jersey. This plan was opposed by residents of Republican-controlled Hunterdon County as well as sportsmen and property owners in the north Jersey lake region.

• **Round Valley abandoned**—In July, the Republican-controlled legislature came up with a report by a New York engineering firm, Tippetts-Abbett-McCarthy-Stratton, which recommended scrapping plans for the Round Valley project and building a reservoir at Chimney Rock in Somerset County instead.

After public hearings on the matter, the governor reluctantly agreed to the Chimney Rock plan, referring to it as "the best plan I can get from the legislature." But the governor added: "Responsibility for the terms of this legislation, however, must rest with the legislature."

As the political smoke began to clear away, one thing became evident; if the voters approve the November bond issue, construction could get under way in the Spring and the first stage of the project might be completed as early as 1959.

Aid to Navigation

Design under way on new Tennessee River lock

Design work for proposed navigation improvements at Wilson Dam in north Alabama is under way as a result of a $300,000 appropriation made by Congress at its last session.

Plans call for a new Tennessee River lock to supplement present facilities, which are more than 30 years old and considered too obsolete to handle today's barge traffic.

The new lock will have an inside chamber that is 110 ft wide and 600 ft long. It will feature a maximum lift of 100 ft, making it the highest single lift lock in the world.

Under the proposed plan, the downstream approach channel to the new lock will be at a lower level than the existing Florence Canal and therefore will bypass Lock and Dam No. 1. The channel, which will be dredged to provide a minimum depth of 11 ft, will follow the alignment of the present canal from Sweetwater Creek to the new proposed lock. A third lock chamber would be added downstream from the existing double lock at Wilson Dam to provide for the lift now required at Lock and Dam No. 1.

Improvement plans also call for the present highway bridge to be replaced by a new high-level span.

Traffic through Wilson Locks has risen from 452,000 tons in 1945 to more than 2,100,000 tons in 1954. Each tow now requires more than 5¼ hours to negotiate the three locks and approaches. The same tows would pass through the proposed new lock in 50 minutes.

Change in Plans

New design for California power project expected to cut cost, boost capacity

Pacific Gas & Electric Co. is seeking approval of the Federal Power Commission and the California Public Utility Commission on design changes in its Kings River hydroelectric project.

The new design for the central California project is expected to trim $900,000 from the original cost estimate of $80 million. It also will develop an additional 2,000 kw to boost the total generating capacity to 276,000 kw.

Under the new plans Haas powerhouse will be built 500 ft underground, in a chamber carved out of the mountainside. This is considered a more economic way to develop head than the proposed $13,500-kw Wishon powerhouse. Wishon penstock, powerplant, afterbay dam and transmission line have been dropped from the project.

At two powerplants—Haas and Balch—two large vertical shaft multiple-jet impulse turbines have been substituted for three smaller horizontal shaft double-overhung impulse turbines.

The system will include:

• Helms Dam, a rockfill structure to be located on Helms Creek, a tributary of the north fork of Kings River. It will be 290 ft high, 840 ft long, with crest elevation of 8,174 ft. The dam will develop 102,000 acre ft of storage on Helms Creek.

• Wishon Dam, a rockfill structure on the north fork of Kings River. It will be 250 ft high above the streambed, 3,350 ft long at the crest, with crest elevation of 6,550 ft. Water will be released by streamflow into the 128,000-acre-ft Wishon Reservoir.

• Haas power plant, developing 128,000 kw from two generators. A 13-ft dia tunnel, 33,000 ft long, will deliver water to the plant. A 2,000-ft tunnel will carry water from the plant to the Balch diversion reservoir.

• Balch powerhouse, diversion dam and afterbay dam. Two 54,000 kva generators will be added to this 28-year-old plant, boosting its capacity from 34,500 kw to 126,000 kw. Height of the diversion dam will be raised 44 ft and the afterbay dam will be elevated 32 ft.

• Kings River power plant, with a capacity of 42,000 kw. Water will be delivered from Balch afterbay dam to this plant through a 13-ft dia, 20,000-ft-long tunnel and a 1,700-ft penstock.

Work already has started on Wishon Dam as a result of a limited certificate issued by the State Public Utility Commission (ENR May 5, p. 25).

Urban Links for U. S. Road Plan

Bureau of Public Roads approves 2,300 mi of highways in 102 urban areas to complete designation of interstate system

With broad strokes that show the general location of interstate highway routes through and around 102 urban centers, the Bureau of Public Roads last week completed overall designation of the 40,000-mi national system of interstate highways Congress authorized in 1944.

The new urban links, spurs and bypasses add 2,300 mi to the 37,700 mi of cross-country route locations designated in 1947. Those earlier routes were selected in cooperative action by the states to form a network connecting the principal cities and industrial areas of the nation. Last week's additions fill in the gaps purposely left open at that time to permit later decision on the difficult questions of urban connections and extensions needed to round out the system.

As has been true all along for the earlier interurban locations, the new approvals fix only the general routes of the interstate system in the metropolitan and urban areas. The important transportation lines—or corridors of traffic—are established, but they are not tied to any existing streets or roads. Final locations will be determined as the states go ahead with projects for improvement of interstate routes in their heavily populated areas.

• **Locations eligible for aid**—Urban locations approved by BPR were recommended by the state highway departments. Some states had hesitated about locating the urban traffic channels for their interstate roads, even in a general way, but the imminence of a national highway program made some kind of decision necessary.

Newly designated locations, of course, are eligible for 60% federal interstate aid under the 1954 Highway Act. They also will be in line for any increase in federal assistance that may be enacted in new legislation.

No change in federal highway policy is indicated or implied in the new approvals. Toll bridges and tunnels are included in some of the urban routes recommended by the states and approved by BPR. In some places, too, the locations appear to include portions of toll roads. However, no federal funds can be used to help pay the cost of toll roads, though federal aid can be applied to toll-free highways connecting with toll bridges and tunnels.

What the 2,300 mi of interstate urban sections will cost is anybody's guess. State estimates of the cost of building the previously designated 37,700 mi to 1975 standards total $23 billion, as noted in the BPR report to Congress on highway needs. Presumably, the states included the estimated cost of interstate urban connections in their $49-billion total figure for all other federal-aid roads.

• **Many expensive projects involved**—A good part of the newly designated mileage would be in the most expensive brackets, near the high average of $10 million a mile for highways of more than six lanes in urban areas. But a large mileage for circumferential and spur routes probably would fall in a semi-rural classification where costs could be kept down if right-of-way is acquired promptly. Some portions of these roads, as well as locations through smaller cities, might be in four-lane category, estimated to cost an average of $450,000 per rural mile and $1.6 million per urban mile.

To start one of the urban connections, a state highway department will first make a project proposal to BPR covering the link, bypass or spur. After getting approval of this preliminary proposal, the state will work up and submit project items for construction of sections of the route.

Before BPR approves any of these proposals, it is likely to ask for origin and destination studies within the metropolitan area. These studies will indicate the "desire lines" (the routes that traffic wants to use), which then have to be reconciled with the hard facts of engineering and economic feasibility.

At this point, there will be a field inspection of possible locations, backed up with survey notes, maps and preliminary plans. Finally, after selection of the location, the highway department will make formal submission of plans, estimates and surveys for the project it desires to build. When BPR gives written approval of the submitted data, the state highway department can issue a call for bids and award a construction contract to the successful bidders. Formal approval by BPR obligates federal-aid funds to the extent of authorized federal participation in the project.

New Jersey Pushes Expressway Plans

New Jersey's Highway Department has lined up 14 highway improvement projects for the current fiscal year costing $34.1 million. In addition, it is looking ahead to the future by pushing plans for resurfacing Pulaski Skyway and building a 10-lane expressway link with the George Washington Bridge.

The future highway plans have a good start. Three possible alignments for the proposed expressway have been submitted to the U. S. Bureau of Public Roads for approval. The 18-mi superhighway will run from Paterson to the western end of the Hudson span. Although the route has not been made public, it is known that plans call for four vehicular lanes in each direction and two center lanes for rapid transit by rail or bus.

The expressway already has caused complications:

New Jersey's Gov. Robert B. Meyner has asked the Port of New York Authority to slow down on plans for the double-decking of the George Washington Bridge (ENR Jan. 20, p. 28). The bridge project reportedly will have to be deferred until New Jersey can handle the increased traffic by completing the expressway connection.

The New Jersey road department's second big future project—adding a coarse "sandpaper" finish to Pulaski Skyway—is planned as a safety measure.

During the past quarter century, the surface of the elevated highway between Newark and Jersey City has been worn smooth. The Highway Department, which has conducted tests to develop a special rough surface for the roadway, has finally arrived at a formula of hot tar, stone chips, more hot tar, and a sprinkling of grits.

A second safety step for the Skyway will be installation of a concrete-and-steel barrier to separate opposing traffic lanes. Specifications call for a 16-in.-high barrier that will provide two separated lanes of traffic in each direction.

Aside from the $34.1 million budgeted for various road improvement projects this year, $5.5 million has been earmarked for right-of-way acquisitions prior to public announcement of new route locations. By thus trying to avoid the usual real estate speculation that attends new route plans, state highway officials are hopeful of saving from 30% to 50% of the total cost of some of their future projects.

A Monster Moves Over 3,100 Miles of Water

The world's largest dredge—The Western Chief—is now at work at Kings Bay, Ga., after completing the longest and probably the most difficult voyage ever attempted by an inland water dredge.

The Western Chief, with no motive power of its own, was tugged and pushed from Yankton, S. D., where it placed a substantial portion of the fill for Gavins Point Dam, to Kings Bay, Ga., for a harbor deepening job. Much of trip was uneventful; but the first leg of the journey, from Yankton, S. D., to Omaha, Neb., was a nightmare to the captain of the Chief and his crew.

When its work was completed at Yankton, Western Contracting Co., of Sioux City, Iowa, owner of the Chief, decided to take the dredge to Georgia by water, although the dredge is so constructed that it can be broken down into sections and transported on 90 flat cars.

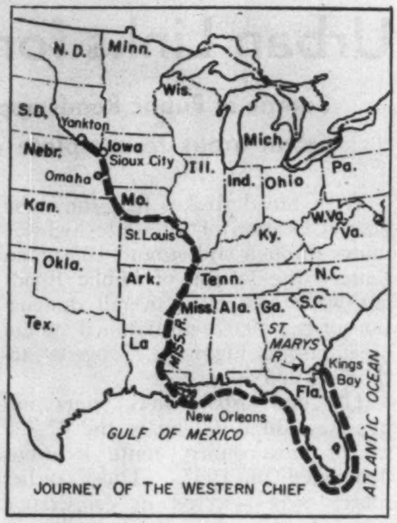
The decision to use the water route meant taking the Western Chief down the Missouri River to St. Louis, down the Mississippi to New Orleans, across the Gulf of Mexico, around the tip of Florida and up the Atlantic coast. Total mileage involved: 3,152 mi. Distances: Yankton to Omaha, 208; Omaha to New Orleans, 1,802; open water, 1,100.

Toughest leg of the trip was from Yankton to Omaha. The problem was too much boat and not enough river. From Yankton to Sioux City, the river is completely in a natural state, interlaced with sand bars and without channel works. Over much of the 128 mi from Sioux City to Omaha, the river has reverted to its wild state. Against this was arrayed the size of the boat itself. The Western Chief is 170 by 46 ft. The 1,500-ton, 11,000 H.P. boat has a draft of nine feet.

Worst trouble came immediately below Yankton at the mouth of the James River, the mouth of the Vermillion and at Elk Point, S. D. In this reach, it took the pontoon-supported Western Chief 34 days to go 35 mi. One stretch of 15 mi took 14 days. As the awkward monster waddled over its watery obstacle course, a captain with 33 years experience exhibited his resourcefulness, winching the craft over shallow spots, unlimbering the giant cutterhead so the Western Chief could chew its way through sand bars, freeing the dredge again and again as the river trapped it.

The company originally scheduled five weeks for the entire 3,152 mi journey to Kings Bay. But the river wrecked the timetable. It took eight weeks and five days to make the trip from Yankton to Omaha, a distance of 208 mi.

At Omaha, start of the deeper water, came the first of a series of modifications. Because of the pontoons at the stern and the cradling of the spoil pipe outlet, the towboats couldn't get close enough to engage their towing knees to push the craft downstream. So, the Western Chief got a bustle. A section of 30-in. dredging pipe was set out over the stern to give the towboats a butting surface. At St. Louis, there were more changes, as pontoons (not needed for the deeper Mississippi) were cut off. And, at New Orleans, where the Western Chief went into drydock to prepare for the salt water leg of the trip, sealer strips were welded at the seams to prevent salt water corrosion, cutterhead and spuds were removed, all openings were sealed, and a breakwater, made up of 4 by 10s, was built across the back of the vessel.



JOURNEY OF THE WESTERN CHIEF

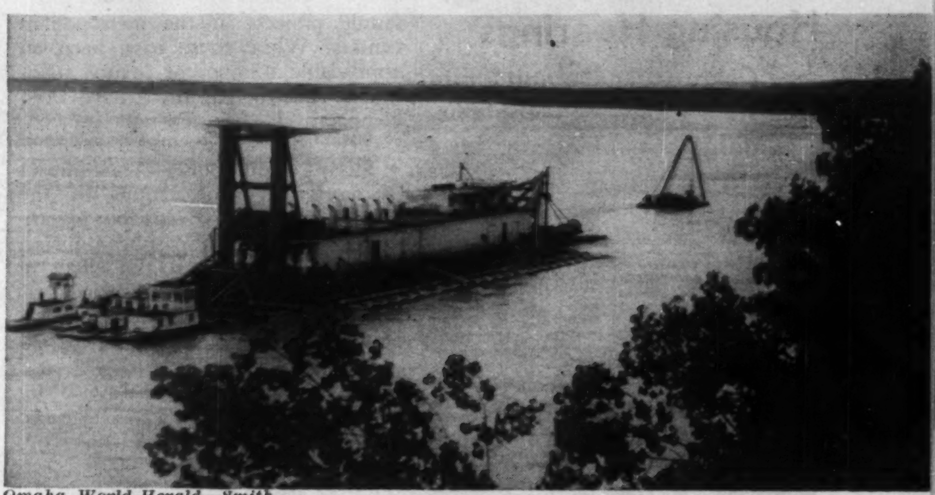
Pontoons, barges help on tough stretch of river . . .

With its 140-ton cutterhead assembly cradled on four barges and with 62 pontoons attached to the hull to reduce its normal 9-ft draft to 5½ ft, the Western Chief slips into the Port of Omaha, completing the first—and most difficult—leg of the long trip.

Omaha World-Herald—Breeling

. . . A winch helps Western Chief over shallow spots

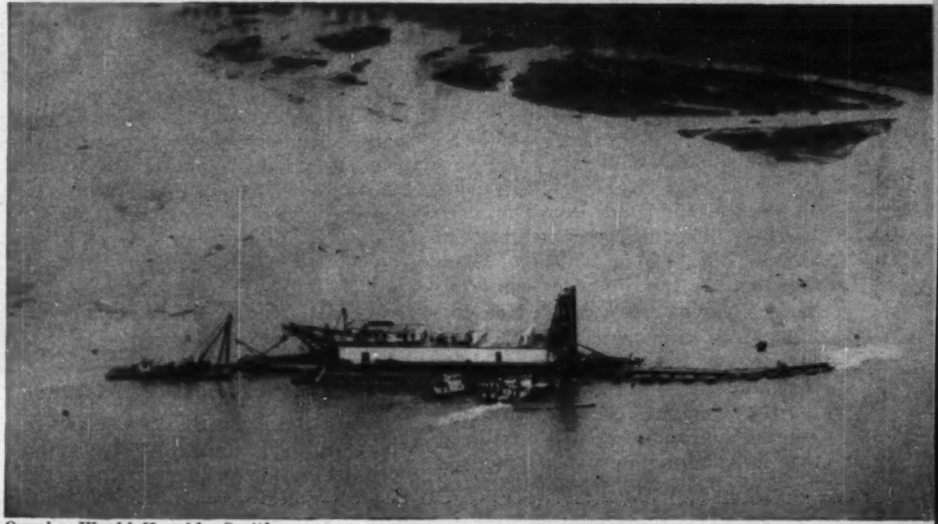
The massive dredge was plagued with shallow water and frequent groundings. One of the worst spots was this one at Vermillion, S. D., where the dredge was winched while four tugs pushed. The longest distance covered without grounding in the first stretch was one-half mile. Plans called for the dredge to be tied up at night—when things were going smoothly. But, when the Chief was grounded, the 32-man crew worked around the clock, dredging or pulling free. For much of the eight weeks, the crew of the Western Chief had a lot of work—and little sleep.



Omaha World-Herald—Smith

. . . But the Chief helps itself through sand bars

When a sand bar was really tough, the Western Chief's cutterhead was unlimbered and the dredge chewed its own channel. But this was frustrating because the sand that had been cut loose quickly reformed ahead of the boat. In effect, the sand bar was travelling just ahead of the craft and as much as 1,000 additional feet of dredging had to be carried out in some places. To use the cutterhead, the Chief required fuel. But the dredge had no tanker barges. Capt. H. H. Coleman's solution: Two pontoons were cut loose and towed ashore as tiny tankers. Two tank trucks of fuel oil were used a day when the cutterhead was in operation.



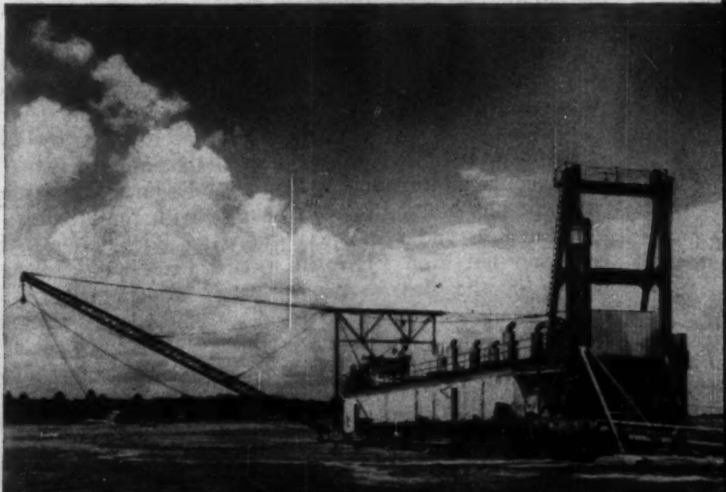
Omaha World-Herald—Smith

. . . Another close scrape for the Chief

A hint of the trouble to come turned up at the very start of the trip when the dredge was eased through the Yankton drawbridge by anchor lines. The boat cleared—but it scraped the paint off the rivets of its spud framework assembly, as it went through.

Vlasak

WORKING AT KINGS BAY, GA., the Western Chief will dredge approximately 10,000,000 cu yd of material from the St. Mary's River and Cumberland Sound to provide water access to an Army Engineers' ammunition loading terminal.



Housing Hearings

Congressional unit airs slum-clearance problems, defects in housing laws

A House banking subcommittee was scheduled to open hearings in New York this week as the first stop on a nation-wide tour to find out why slum clearance and public housing projects are not being built as fast as Congress intended when it passed the new housing laws.

Specifically, the subcommittee, headed by Rep. Albert Rains (D.-Ala.), wants to find out why loan guarantees aren't being given to private builders for housing in slum-cleared areas, what happens to the families moved out of a slum area by a clearance program, and what damage—if any—is being done by the Administration's tightening of mortgage credit.

When the House banking subcommittee concludes its New York hearings, it will move on to Philadelphia for two days, Oct. 12 and 13. Then an interim report may be issued, with hearings scheduled to be resumed around Nov. 10 in Chicago. From Chicago, the subcommittee will go to San Francisco, Los Angeles, New Orleans and Birmingham, military housing projects will be inspected along the route.

After Congress convenes in January, the subcommittee will hold hearings in Washington at which federal housing officials will testify.

- **Loan insurance difficult**—The subcommittee will direct special attention to the operation of Sec. 220 of the Housing Act of 1954. This section was added as an amendment at the last session in an attempt to provide loan guarantees on housing built in slum-cleared areas. The amendment authorizes the Federal Housing Administration to insure loans on such housing.

But it has been difficult to get loan insurance on projects of this type because the new housing is located close to slum areas and commercial property, and not even FHA had been willing in the past to insure such loans. Congress thought that legislation authorizing FHA to make these loan guarantees would break the bottleneck, but to date FHA has failed to issue a single commitment.

Through the public hearings, the subcommittee hopes to find some way of making Sec. 220 work.

Another housing problem that will be studied is the failure of private builders to construct low-rental, multifamily projects in the metropolitan centers. While there have been an appreciable number of luxury apartments constructed, there have been comparatively few low-rent projects.

- **Study credit policy**—The impact of mortgage credit actions by the Administration also will be investigated by the House subcommittee, which wants to assess the effect of actions requiring a small downpayment (2%) on VA-insured loans and also shortening the maturity period on mortgages.

Other credit problems that are expected to come up at the hearings: action by the Home Loan Bank Board urging savings and loan associations to make fewer housing loans, and raising of the rediscount rate by the Federal Reserve Board.

Meanwhile, a Senate subcommittee plans to conduct staff studies this fall on mortgage credit, underwriting procedures, and housing for the aged.

The House Veterans Committee will continue its investigation of housing problems affecting veterans. This committee has just completed hearings in California on alleged abuses by builders.

Adm. Perry Dies

BuDocks Chief Had Key Role in Creating Seabees

Rear Adm. John R. Perry

Rear Adm. John R. Perry, Chief of the Bureau of Yards and Docks and manpower director in creation of the Seabees during World War II, died Sept. 25.

As BuDocks' director of administration and personnel during the war, Adm. Perry built up the newly-created Naval Construction Battalions to a force of 250,000 men under the leadership of Adm. Ben Moreell, wartime Chief of the Bureau. Adm. Perry had top responsibility for enlisting, training, organizing, equipping and dispatching the construction battalions overseas. At the same time, he had to obtain more than 9,000 qualified Civil Engineer Corps reserve officers to serve with these units.

Born in Waco, Tex., in 1899, Adm. Perry was graduated from the Naval Academy in 1923. He later continued his engineering training in the postgraduate school at Annapolis and at Rensselaer Polytechnic Institute, where he received degrees as Bachelor and Master of Civil Engineering.

Adm. Perry had served in the Civil Engineer Corps of the Navy since 1927. After organizing the Seabees, he became—in August 1944—officer-in-charge for the Hawaiian area of the Naval construction brigades with the service force of the Pacific Fleet. Early in 1945 he took command of 35,000 Seabees in the Southwest Pacific, with headquarters in the Philippines. He returned at the end of that year to become public works officer at the Naval Academy.

In 1948, Adm. Perry was recalled to BuDocks headquarters as Assistant Chief of Operations and moved next to the Naval Construction Battalion Center, Port Hueneme, in 1951. In December 1952, he was promoted to Rear Admiral, and a few months later became director of the Pacific and Alaskan Divisions for BuDocks. President Eisenhower nominated him to be Chief of the Bureau and head of the Civil Engineer Corps in 1953.

Patent Suit Filed Against Sewer Authority, Contractor

A patent infringement suit has been filed in federal district court against the Buffalo, N. Y., Sewer Authority and a local contractor.

The action was brought by the Pacific Flush Tank Co., Chicago, and six individuals who claim the authority and Henrich Construction Co., Inc., violated patent rights for a "sewage sludge process."

Also named as a defendant is the Ralph B. Carter Co., Hackensack, N. J., which the complaint charges induced the authority and the Henrich firm to infringe patent rights.

A spokesman for the Sewer Authority said the patent rights involve the recirculation system used on sludge tanks at the Bird Island sewage treatment plant. Pacific Flush Tank Co. was described in the court action as owner of exclusive patent rights for the invention.

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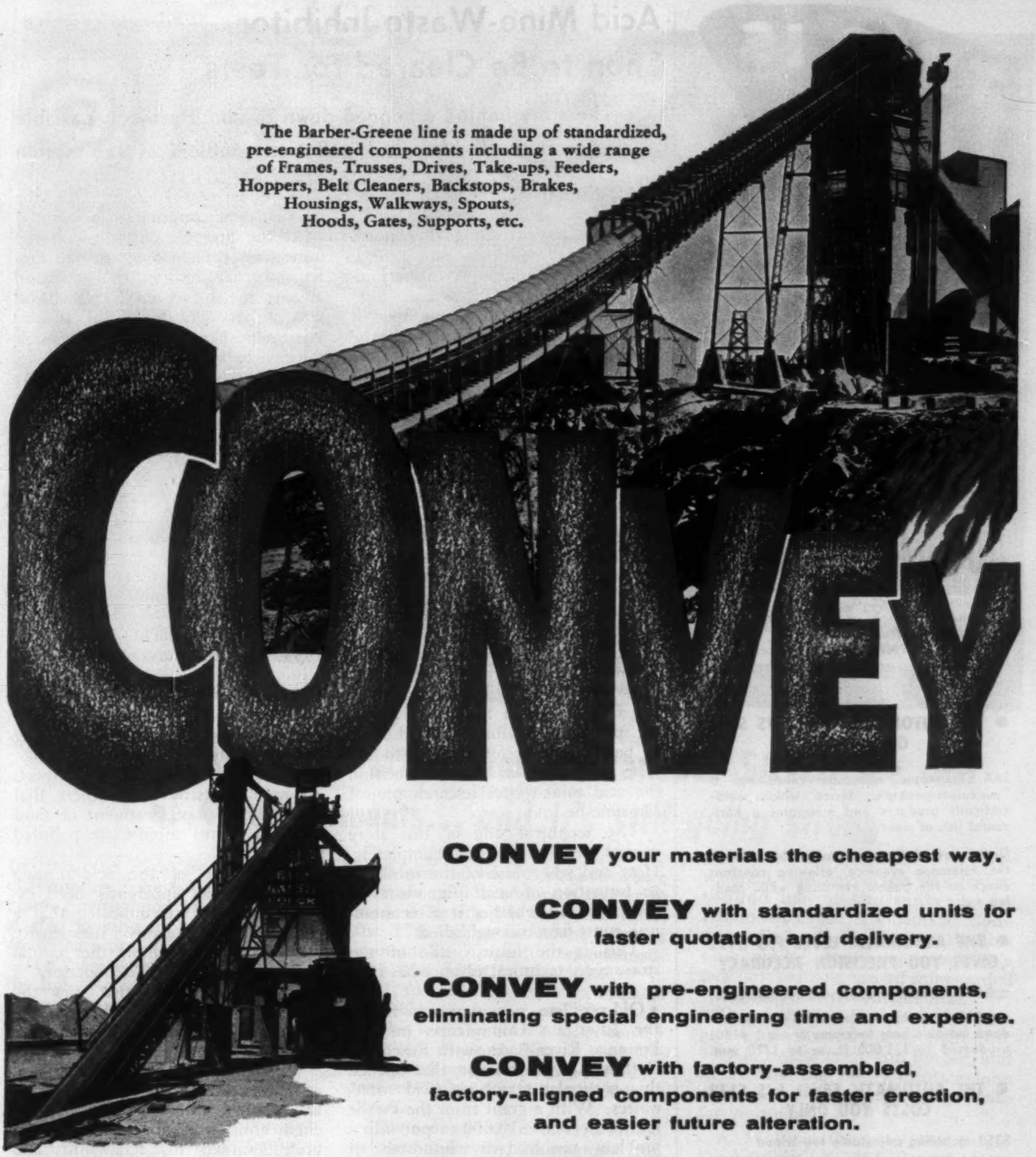

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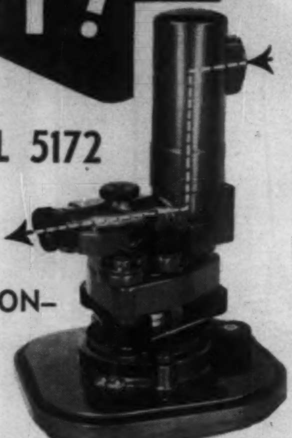

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Acid Mine-Waste Inhibitor Soon to Be Cleared for Tests

The story behind a bogged-down research project, possible answer to No. 1 water pollution problem of the nation

A situation fraught with all the personalities and intrigues of a fictional plot is unraveling after nearly two years of confusion and frustration over a significant scientific finding.

Perplexities that had enveloped it finally have been dispersed from the seemingly simple but important laboratory finding that an inhibitor might prevent natural formation of acid in active and abandoned coal mines.

This finding was heralded two years ago as possible answer to the vexing water pollution problem of acid seepage (ENR Feb. 12, 1953, p 24) and soon thereafter was reported as going to the field for tests. Actually, however, all that started was an interlude of unpublicized troubles for the hopeful project that prevented complete field tests of what was expected by some to answer the last unsolved stream pollution problem.

Now at last, with legal papers fixing patent rights reportedly moving slowly but surely through the patent office, the promising inhibitor should seem to be able to go uninhibited to the tests. Essentials of the story behind the acid mine-wastes research project can now be told.

The technical side of this story cannot yet be reported completely. How and where use of the inhibitor to formation of acid mine-wastes is practical—and whether it is economical—must first be established.

This is the human side of the story; every technical advance has one.

• Old problem, new approach—It was the Interstate Commission on the Potomac River Basin, with Edwin R. Cotton then its director, that opened this particular attack on acid mine-wastes. With a grant from the Public Health Service—$10,000 to put into a problem unsolved by hundreds of thousands already spent—a delegation from the Potomac River Commission went to talk it over at Johns Hopkins University in Baltimore.

The university's high-powered sanitary engineering staff (Professors Wolman, Renn and Geyer) agreed to undertake the research and indicated they would seek a new approach.

Their approach was indeed different, and it turned out to be direct. They summoned to the task the university's Professor Walter A. Patrick, physical chemist of note who had for years concerned himself with the mechanics of corrosion.

At the first session in which the mine-acid problem was posed to Professor Patrick, he took chalk in hand and sketched out on a blackboard what he thought to be the answer. His theory had his years of corrosion research back of it.

To investigate Patrick's theory, a fellowship then was awarded (with the Potomac Commission's grant from PHS) to a young, active-minded chemical engineering student, Floyd W. McCollum. Since this was a fellowship, and not contract research, the university intended that findings be free of restriction on publication.

McCollum's laboratory work soon confirmed Patrick's theory. But from then on, nothing simple developed.

• Into the limelight—In January, 1953, newspaper accounts told that Johns Hopkins scientists had discovered an inhibitor to the reaction of air, water and pyrites in coal mines that forms the sulphuric acid seeping out to pollute streams. Sanitary engineers were electrified at the prospect. So were industries and others that suffer the cost of treatment of (and corrosion from) mine-waste polluted waters.

The nature of the acid-forming mechanism had apparently been exposed. And it was indicated that a choice of reasonably inexpensive chemicals could inhibit the natural reaction—at least in the laboratory.

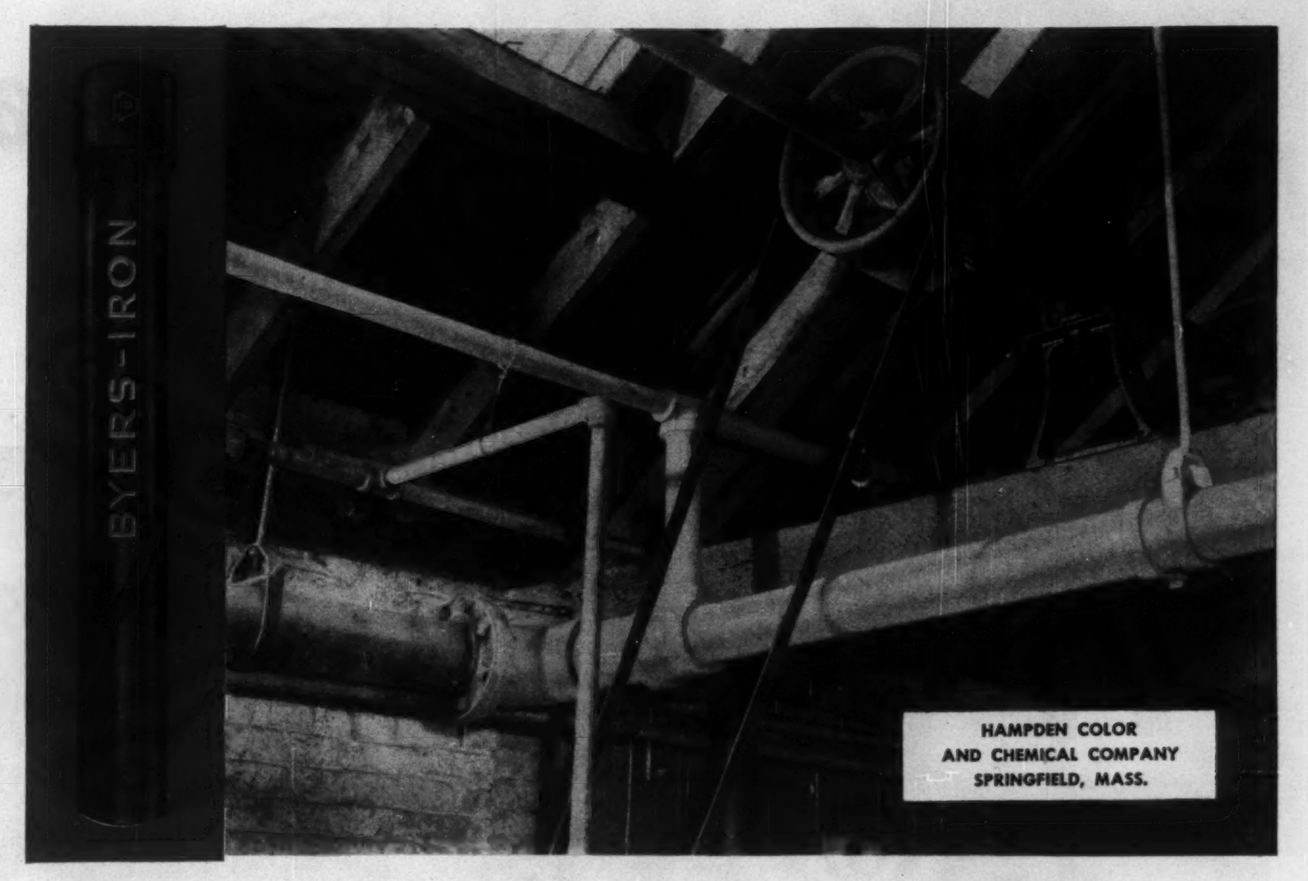
It was announced that now the finding would go to the field for the real test of Professor Patrick's ingenuity.

At about this point, McCollum, carried away with the potential of his lab findings, threw up the chemical engineering work for which he had been awarded his fellowship, and went on the payroll of the Potomac River Commission to run investigations in a mine of Pittsburgh Consolidation Coal Company near Fairmount, W. Va.

• Question of ownership—Dr. Patrick, who had provided the answer, and McCollum whose lab work had sustained it, had definite ideas on who owned their finding.

Having had experience in these matters, Dr. Patrick had applied for

(*Continued on page 32*)



This WROUGHT IRON PIPE installation has SAVED the cost of 4 replacements... *and it's still going strong*

In 1941, the Plant Superintendent of Hampden Color & Chemical Company, Springfield, Massachusetts, started looking for an answer to a recurring piping failure problem.

His maintenance records charted the life-span of the piping material he had been using for the dry-sprinkler-pipe system at about three years. There was no question about the severe corrosive conditions that constantly threatened the service. The system, located on the ceiling of the dye room, collected dye dust which contained a large percentage of sodium chloride. Condensation created by the operation in the dye room kept the pipes wet. The result was a weak "salt bath" which caused outside corrosion.

After careful investigation of performance records in services where corrosive conditions were similar to those affecting his sprinkler-lines, the Plant Superintendent selected wrought iron pipe for replacement. The first quantity was installed in 1941, followed by a greater tonnage in 1943.

The installation was recently checked. Records reveal that the wrought iron pipe has given trouble-free service, and is still in good condition.

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Griffin pumps used to install "Texas

Six heavy-duty, large-volume pressure pumps performed dependably in caisson jetting for first ocean radar platform. Caisson legs were sunk 45 ft. below ocean bottom by the contractors—Raymond Concrete Pile Co. and DeLong Corp., a joint venture.

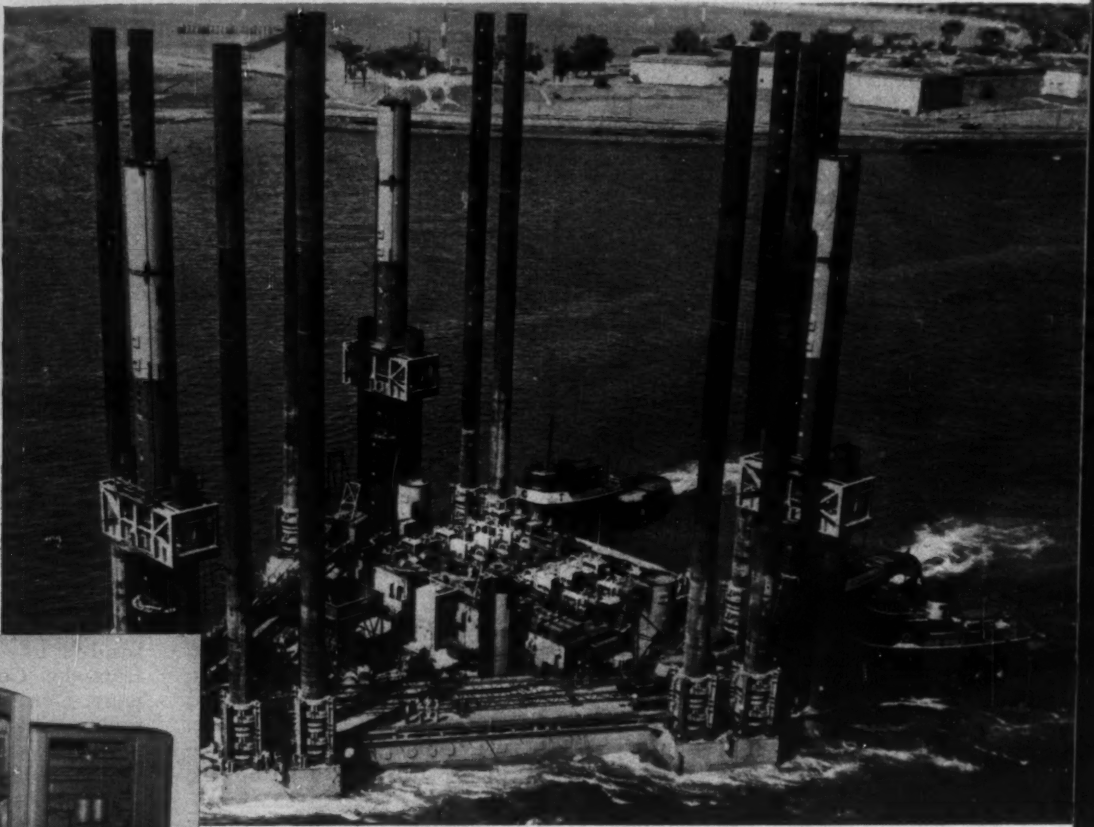
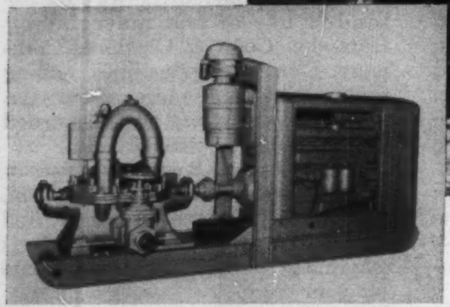


Photo courtesy RAYMOND-DELONG

Photo shows pumps mounted on radar station as the 6,000-ton steel structure is towed down Boston Harbor to Georges Banks, east of Cape Cod. Here, its 3 legs were dropped 56 ft. to the ocean floor and then sunk 45 ft. deeper. Air jacks raised the platform 81 ft. above water level.

1200 G.P.M., 251 P.S.I.



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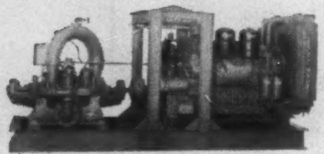
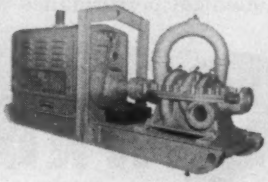
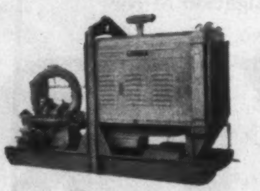


1400 G.P.M., 303 P.S.I.



650 G.P.M., 260 P.S.I.

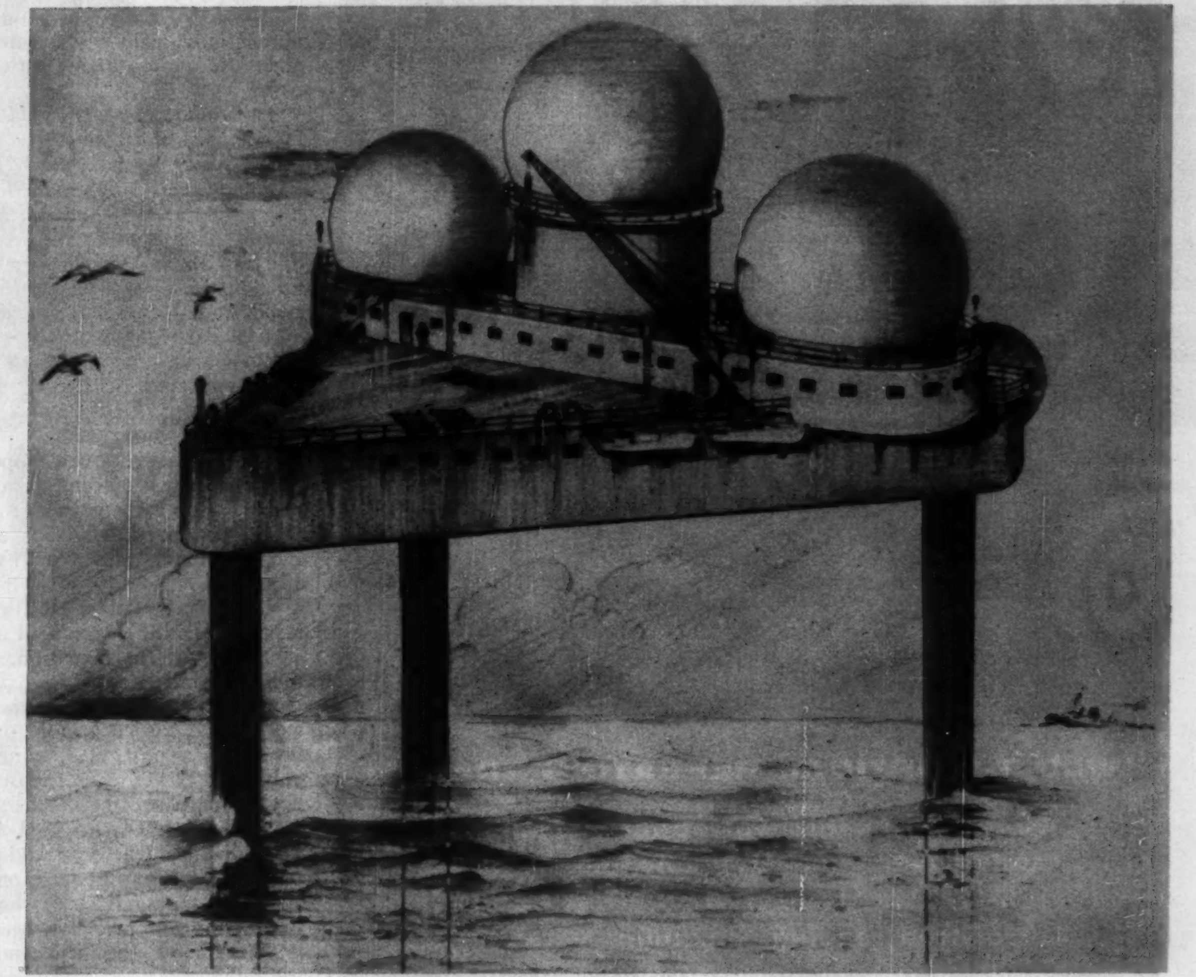


650 G.P.M., 205 P.S.I.

400 G.P.M., 175 P.S.I.

Tower" in complex jetting operation

Drawing courtesy MORAN, PROCTOR, MUESER & RUTLEDGE *and* ANDERSON-NICHOLS



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a patent. And he generously had assigned half interest in the patent application to McCollum. (Patent law requires that individual inventors make this application; it was made in accordance with wishes of the Potomac River Commission.)

Meanwhile, McCollum made some field tests for the commission but reported only orally. The commission and McCollum finally parted company.

The Public Health Service held to the established position that any patent resulting from research financed by public funds must be dedicated to free public use. Dr. Patrick had written his application broadly, to include much of his personal findings on the general mechanics of corrosion, far afield from the special application to mine wastes. He was willing to license anybody to use the portion of his findings applicable to stream pollution abatement.

• **With settlement, new hope**—Now, at last, accord has been reached and a patent is due to be issued.

- The patent will belong to Patrick and McCollum, and it does apply to all pyrites.
- The U. S. Public Health Service may employ, for government use only, all aspects of the invention, without right to sublicense.
- The Potomac River Commission will hold exclusive license to use the invention against acid mine wastes only, with power to sublicense for this limited purpose, free of charge.

All this adds up to final, legal establishment of who owns and who can use the laboratory findings of Patrick and McCollum. It clears the way at last for the vital field tests to establish practicality of the acid mine-waste inhibitor.

The field tests are essential. Financing for these tests should be fairly readily available.

Sanitary engineers may once more rejoice; the scientific advance of two years ago seems unshackled from its human entanglement.

New York Planning Firm Gets Contract in Cuba

Paul Lester Wiener, Jose Luis Sert and Paul Schultz, partners of Town Planning Associates, of New York City, have been awarded a contract to act as chief consultants to Cuba's newly-created Commission of National Planning.

The firm also will advise the Minister of Public Works.

Scope of the work includes regional planning as well as a master plan for Havana as well as other Cuban cities.

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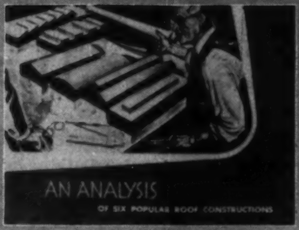

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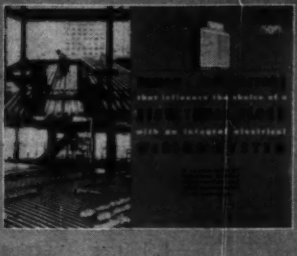

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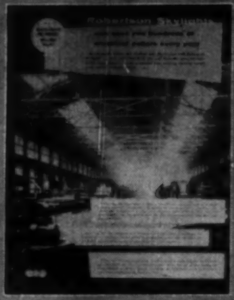

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6

M-Type
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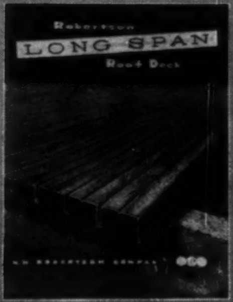

8

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1. Acoustical Data on Q-Deck: It has long been known that the fluted underside of steel deck provides some acoustical value, yet demand for more has led to this new low-cost method. Application details and test data are included.

2. An Analysis of Industrial Roof Construction: This valuable booklet compares all the better-known roof types (flat, monitor, bow-string, high-low bay, saw tooth) on the basis of structural steel, volume, roofing, sash area, flashing, ventilation and daylighting.

3. Design and Cost Factors of Structural Floor Wiring: This study compares Q-Floor with other conventional floor systems using underfloor duct. Based upon a typical multi-story building, the book is replete with charts and cost analyses of all structural components.

4. Daylighting Cost Analysis: This new and unusual study contains a questionnaire, which when properly filled out will reveal how quickly scientifically planned natural daylighting will pay for itself in a structure through savings in electricity. All data are substantiated.

5. New Composite Q-Floor Catalog: This newly revised catalog contains many examples of the latest Q-Floor buildings and a full exposition of Q-Floor advantages. Structural details and specifications are more complete than ever before.

6. New M-Type Q-Panel Catalog: Recent newcomer to the Robertson product family is the M-Type Q-Panel which possesses unique advantages over other types of modern curtain wall construction. The book contains 3 pages of structural details plus complete specifications.

7. New Long-Span Q-Deck Catalog: Another new Robertson product is this sturdy, yet exceptionally long-span deck. Easy to handle and erect despite its length up to 32 feet, it is especially designed for schools and supermarkets and other structures in which unbroken spans and a saving of structural steel is beneficial.

8. Ventilation Engineering Booklet: More than a ventilator catalog, this booklet not only describes products, but contains detailed tables of exhaust capacities, based upon average wind velocities, temperature differences and height above intake. Use the coupon below.

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A Shopping Center That Can Change

Saving of formwork and adaptability to easy future modification are prime advantages of a design for a shopping center now under construction at Roosevelt Field, near Mineola, N. Y.

Formwork was eliminated for the 1,300 x 700-ft main floor by the use of 4 x 16-ft precast concrete floor panels. Cast near the site, the panels are moved in stacks by straddle carriers to a crane that places them directly on the steel frame to form the main floor.

• **Tunnels for trucks**—While the total area to be occupied by the continuous basement will be 1,300 x 700 ft, the shopping center will appear to shoppers as ten separate structures, attractively landscaped. Beneath the main floor, trucks will move through tunnels to unloading platforms.

Nine of the ten structures will appear as one-story buildings at the shoppers' level. The tenth building, centrally located, will have two stories and be occupied by a department store, and will be the only exception to a basic modular construction plan throughout the project.

Site is the former Roosevelt Field, from which Charles Lindbergh took off on his history-making flight in the spring of 1927. The area around the 143-acre field has long since been heavily built up as a residential area and use as an airfield discontinued some years ago. The ten structures are centered in an area that is large enough to accommodate in addition parking of 10,000 cars.

• **Space to suit what tenant?**—One of the big problems in laying out shopping centers stems from not knowing who the tenants will be prior to construction, so that space can be designed to accommodate them. The owners, Webb & Knapp, Inc., strove for a plan in which they would not have to worry about modification if one tenant —say a shoe store—moved out, and another—perhaps a bakery—moved in. Hence, one major goal was flexibility.

However, flexibility had to have a low price tag—small cost increases in a unit layout could result in large expenditures when extended to the entire project. Economy was a major goal and flexibility could not be achieved at its expense.

To arrive at a plan, W & K conducted extensive studies of other large shopping centers in the U. S. On the basis of information obtained, plus their own ingenuity, the architects, engineers and designers arrived at a plan that met their objectives. The general contractor, consulted before the plans were finalized, was also instrumental in achieving this plan.

Essentially the design is simple: Spread footings topped by pedestals form the base for wide-flange steel columns spaced to provide 26 x 16-ft bays in the basement. Above this level, alternate columns are omitted. There, column bays are 26 x 32 ft.

A 10-in. or 12-in.-thick reinforced concrete basement wall was constructed around the outside of the basement. Truck tunnel entrances 26 ft wide and 12 ft high were left in the wall at various points.

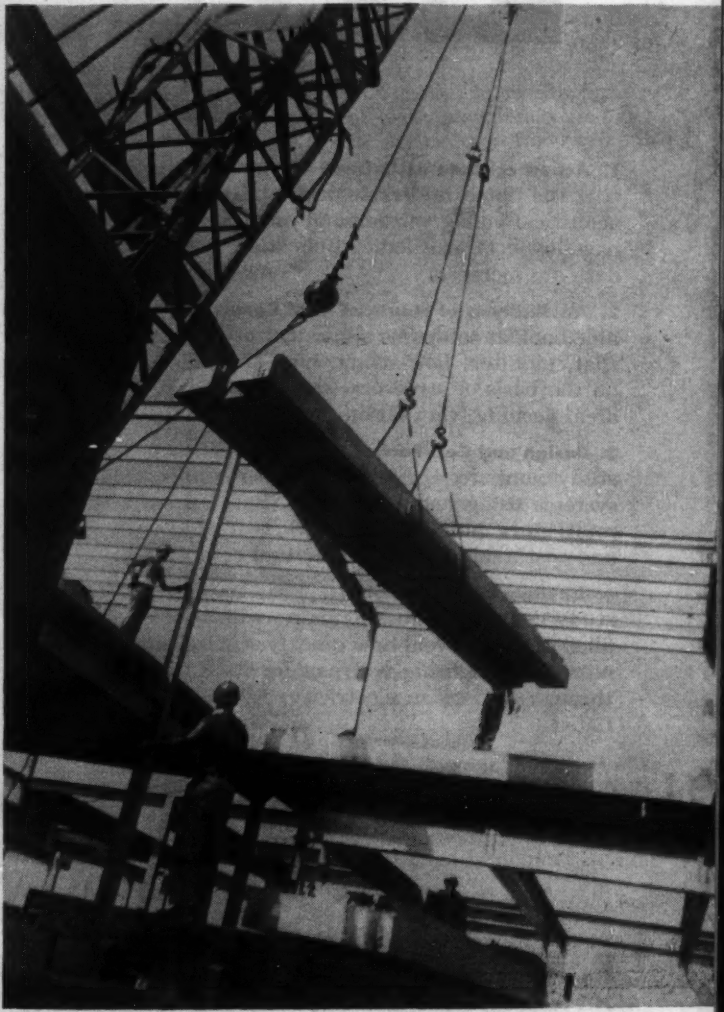
• **Panels do trick**—The flexibility that is the keynote of the structure is provided by the adaptability of panel construction to future modification. Each store area can be adapted to a merchant's needs by merely juggling the floor panels to suit his purpose. Should the prospective tenant desire air conditioning or a heating system of such a nature as to require unanticipated ductwork, necessary opening in the floor can be obtained by omitting a precast panel. Or if the tenant desires a stairway or conveyor system to the basement, the solution is again simple—just leave out a panel. Selected after careful study, the 4 x 16-ft dimensions of the precast slabs are well suited to such purposes, according to the designers.

The flat roof of the building is made up of poured gypsum roofing supported on light tees, which, in turn, rest on I-beam purlins spaced 5 ft 4 in. c-c.

• **Modular design throughout**—The shopping center was designed around a module 6½ ft square. Even the store fronts are based on this module and are also designed to be flexible. Vertical T-mullions at 6½-ft intervals will carry glass or panelling easily interchangeable to meet future needs. A checkerboard sidewalk—designed to provide eye-relief for shoppers—will also employ the 6½-ft module.

Store exteriors will be brick where there are no store fronts. Tenants of the buildings will be separated from each other by concrete block partitions.

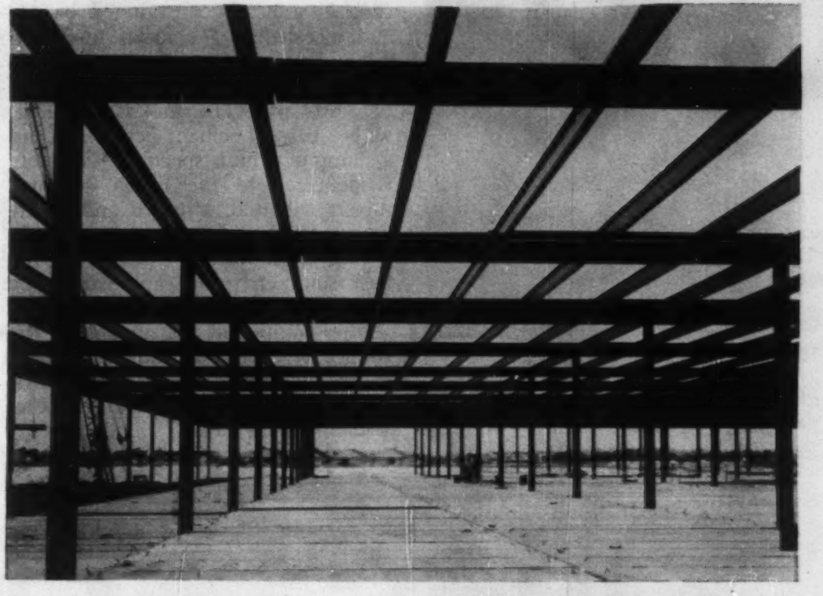
Rectangular recesses have been provided in the main floor at intervals between the buildings, to accommodate shrubbery and trees. Other recesses will be used for



PRESTRESSED PANEL is swung into position over basement truck tunnel where long spans are needed.

With Tenants

Flexible design with interchangeable panels is adaptable to any tenant's needs. Panels, as shown at right, are easily moved to accommodate duct work, stair wells and conveyors.



long narrow pools, where water will spray at various angles. About 2,400 gal of recirculating water will be used.

• **Precast panels placed fast**—Construction of the main floor is simple and proceeds rapidly, with as many as 90 of the two-ton panels placed per day. Panels are channel-shaped in cross section, 2¼ in. thick at the center, with 9-in.-deep flanges. They are placed by a large crane that passes down every third aisle of the building setting them in place on both sides.

The top edge of each panel is recessed lengthwise to form a key. Two adjacent keys form a groove into which are placed V-shaped metal chairs to support a reinforcing bar. The key is then filled with cast-in-place concrete, to carry the shear between panels.

• **Forms have steel parts.** The underside of the finished panel is formed by a reinforced grout mold. Edges of the mold are protected by 1 x 1 x ⅛ in. angles, to which are attached strap-anchored welding plates 4½ ft on center. Side forms are hinge connected to the welding plates and are 10-ga steel sheets with angle stiffeners.

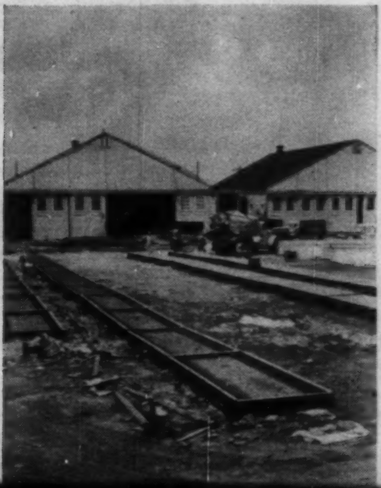
Reinforcing in the precast panels is furnished by a 4 x 4-in. wire mesh supplemented with several heavy, de-

STEEL-SIDED FORMS receive concrete from ready-mix truck for precast reinforced concrete panels. Concrete is then vibrated, screeded and finally broom finished.

STRADDLE CARRIER delivers stack of four precast panels to crane. Planks under carrier distribute heavy wheel load.

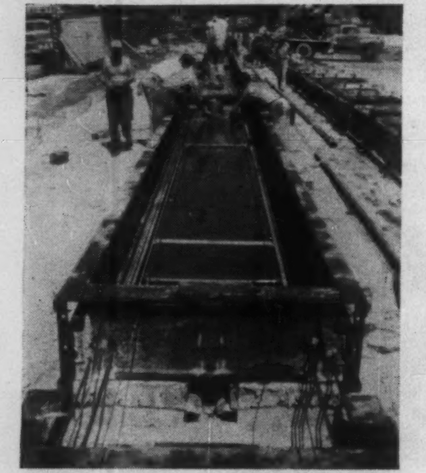
PC-1
PC-1
PC-1
PC-1

CASTING BEDS yielded one pour a day. Panels were removed, stacked for curing.



. . . And Flexibility Can Be Economical

FORM SOFFITS of prestressed concrete are jacked apart to adjust for required panel widths. Gap between soffits houses 3-in. pipe for steam curing of concrete.



DOME FORMS of 10-ga steel are oiled before concrete is placed. Transverse tape covers joints in domes to prevent panel damage from squeeze due to prestress.

formed bars. Steel is tied into a rigid cage in a nearby abandoned hangar and wheeled to the forms in 200-lb assemblies.

Concrete used has a 28-day strength of 3,500 psi. The mix is 1:2.3:3.4, with 6 bags of cement per cu yd, and a slump of 4 in. is specified. Concrete is delivered to the forms in truck mixers, vibrated, screeded and finally broom finished.

Due to the very hot weather of the past summer, great care had to be taken in curing. A clear-resin-base sealing compound was applied to the surface of the slabs, which were then covered with tarpaulins for four days. Primary purpose of the sealing compound was to furnish bond between the slab and the 1-in. topping that is applied after the slabs are in place.

Slabs are removed from the forms by vacuum lift on the day following the pour and placed in curing stacks up to four panels high. After four days of curing they are lifted by straddle trucks and moved to the building where they are hoisted into place. Concrete must have a minimum strength of 800 psi for removal from forms by vacuum lift, and 2,500 psi for erection. Lifting loops of $\frac{5}{16}$-in. dia strands are provided for each of the panel for erection purposes.

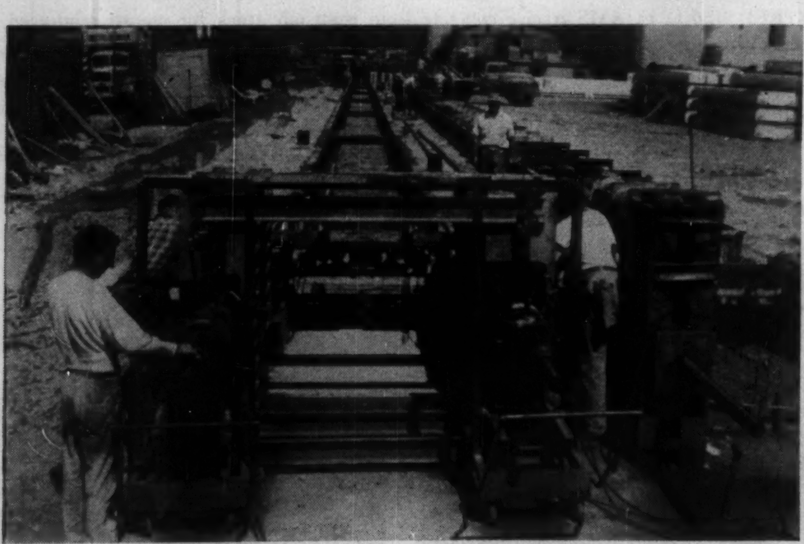
- **Long panels are prestressed**—The precast concrete floor panels with standard reinforcing bars can not be used for the long spans over the truck tunnels. Instead, similar, but prestressed panels are utilized. Lengths vary, depending on the width of the tunnel, from 26 ft to 33 ft, but all are about 4 ft wide. Wires having an ultimate strength of 240,000 psi make up the $\frac{3}{8}$ in. prestressing strands that are anchored throughout their length by bond.

Both precast and prestressed panels are manufactured by Precrete, Inc., but only the prestressed panels are made at Precrete's Astoria, N. Y., plant. One of the most interesting aspects of the whole job is the design and operation of the forms of the prestressed panels.

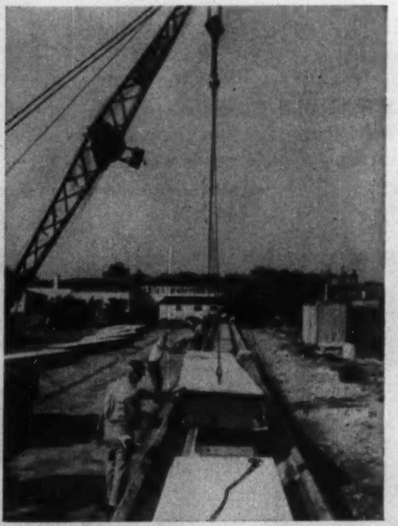
These were the features desired: 1. A tensioning bench several hundred feet in length so that many slabs could be cast in one operation; 2. An arrangement to permit the panels to move freely toward the fixed end of the bench when the tension in the strands is released; 3. A movable and flexible dome, in the forms, since the restraining force applied by the strands at the bottom of the channel flanges tends to camber the panel and in a rigid-dome form would crack it; 4. Ability to strip the forms without delay.

- **Forms are prestressed also**—The existing prestressing bench at the plant (ENR Aug. 26, 1954, p. 36) was modified for the manufacture of these panels. The form has for a base a raised prestressed concrete soffit consisting of two 5-in.-deep, 20-in.-wide and 216-ft-long planks. Outer sides are formed by 5-in. steel channels tied into the concrete with straps. The soffit sits on timber blocks and can be adjusted in width. Hinge-connected to the soffit are 10-ga steel side forms that are held in place by diagonal bracks.

The dome forms also are made of 10-ga steel. These steel domes are placed on timber supports and an-



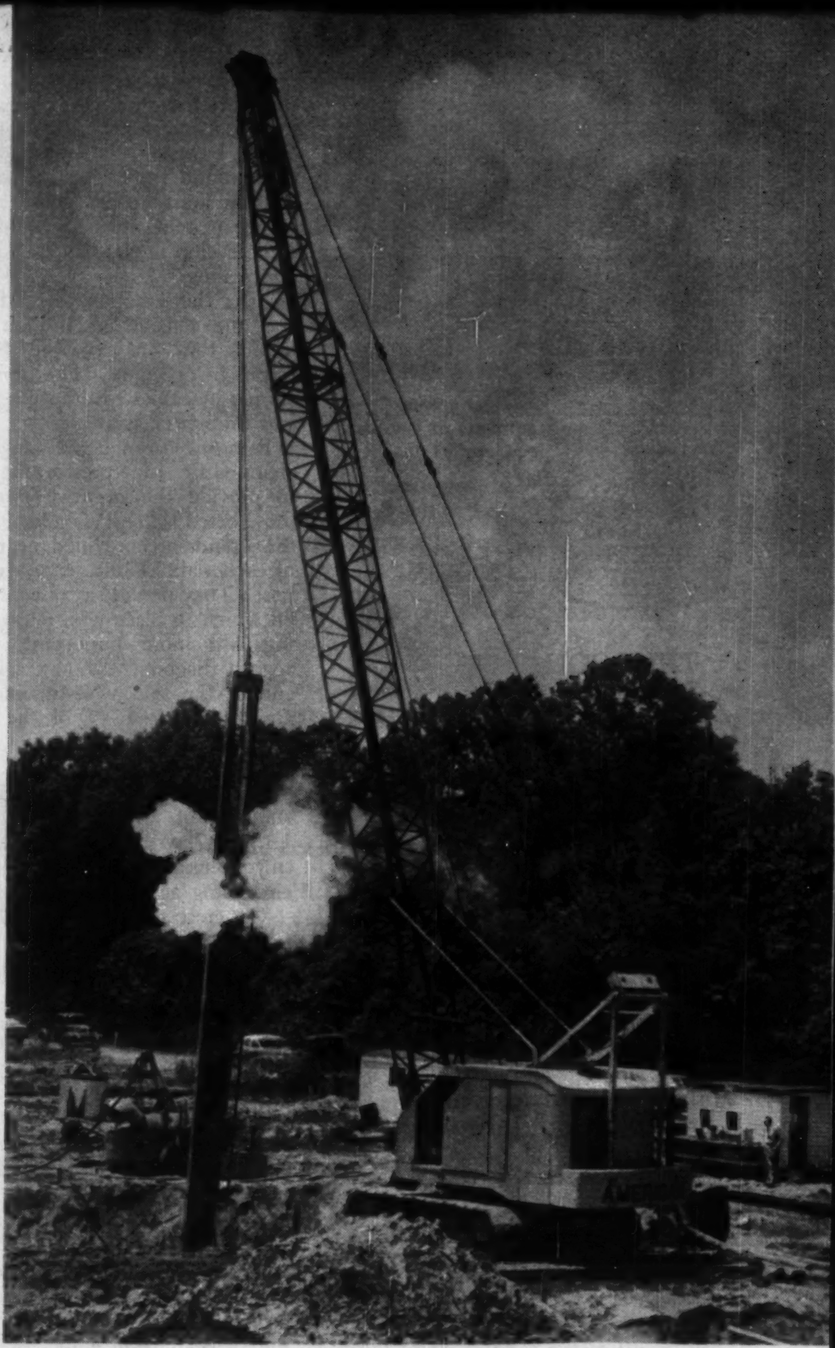
HYDRAULIC JACKS supported on a heavy steel frame apply tension to prestressing wires. Wires are anchored at the far end of the forms.



SIDE FORMS swing open as panel is lifted by a crane.

(Advertisement)

RAPID PILE DRIVING, using a 50-foot swinging lead and No. 1 Vulcan steam pile driver, is one of the many jobs handled efficiently by an American 700 Series Crawler Crane on two Indiana State Highway bridges. Crossing the Patoka River, one of the bridges will be 192-feet long; the other will be a 7-span, 480-foot structure. The steel beam bridges are on 24-foot concrete piers which rest on 36 creosoted piles averaging 60-feet in length. After driving the piles, the American will be used for placing concrete and setting steel . . . all with a minimum of down time . . . thanks to the speed and ease of changing boom sections.



FINGER TIP AIR CONTROLS on the American 700 Series Crane make jobs a lot easier for operator John Walker. Instead of tugging at hard-to-operate mechanical levers, he gets faster action and higher production with American's air controls and he has a sensitive "feel of the load" at all times. John, who broke in on steam rigs 30 years ago, says the American's Air Controls are "the real thing."

Indiana Contractor Reports:

CHANGES BOOM SECTIONS FASTER WITH AMERICAN

In building two bridges 5 miles east of Princeton, Indiana, G. H. Allen, Contractor and Engineer, needed a big, husky crane that could be adapted quickly and easily to handle many different jobs—driving piles, handling and setting steel, and pouring concrete. A new American 700 Series Crawler Crane provided the contractor with the flexibility he needed. The ease with which the American's boom sections can be changed for various assignments reduces down time considerably. John Walker, crane operator for 30 years, says, "I change boom sections faster with less down time on the American than with any rig I've been on!"

ENGINEERING "KNOW-HOW" that goes into the design and production of the American 700 Series Crawler Crane is a result of experience — 78 years making heavy equipment for the world's biggest and toughest jobs. For detailed, factual information on how American Crawler and Truck Cranes can help you cut costs and increase production, see your American distributor, or write American Hoist and Derrick Co., St. Paul 1, Minnesota.

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chored to the soffit with cables. Grout seepage is prevented under the steel domes by using 2-in. plastic masking tape around the edges. A flexible expansion joint in the dome acts as a hinge in relieving any camber that may develop in the panel arising from prestressing.

After the panels have set for a day and the tension in the strands released, they are removed from the forms by a crane. The domes, anchored by cables to the soffit, pop out and drop back into place.

Running through the flanges of the channel are ⅜-in. prestressing strands, to provide the negative moment in the erected slab. Two additional 4-in. dia strands are provided near the top of each slab. These serve a dual purpose. They provide a convenient chair on which to place wire mesh reinforcing and more important, reinforce against diagonal-tension cracks at the end of the slab. Prestressing strands are stressed to 67% of the ultimate strength.

• **Casting**—Concrete used has a 28-day strength of 5,000 psi. The mix is 1:1.85:2.7, with 7½ bags of cement per cu yd, plus a retarding agent and an air-entraining agent. Slump is 4 in.

Concrete is placed in the forms from a non-agitating dump truck delivering from a mixing plant 30 minutes away.

Four hours after the pour, the concrete reaches its initial set. Steam curing is then applied. Supplied by a 30-hp gas boiler, boosted with a preheater, the steam is fed through a 3-in. pipe placed in the gap between the two sections of the soffit, and jets into the domes through ⅛-in. dia holes placed 15 ft c-c. The space is heated to about 180 deg, the concrete to 140 deg. The whole assembly is covered with a tarpaulin to retain the heat and moisture. Concrete reaches the required strength of 3,500 psi on setting overnight.

The working day begins with releasing the tension in the strands of the previous day's pour. Wires are cut, panels are removed and the bed is made ready for the next pour. A flat top truck then hauls the 5 to 7-ton panels to the basement of the shopping center 16 miles distant.

The prestressed panels are hoisted into place at the site by the same crane that places the reinforced concrete panels. But there was the problem of how to get these large panels in place through a forest of first-floor and roof beams. The solution worked out very well when Precrete arranged with Bethlehem Steel Co. to erect the panels. This meant that Bethlehem placed the floor panels while erecting the steel, thus saving considerable idle crane time. The owner gets the building faster because as the steel goes up the concrete panels are placed.

• **Handled as two separate projects**—All work is done by New York City firms. Designer of the precast slab is Val Buergin, engineer-in-charge for Severud-Elstad-Krueger, consulting engineers for the new shopping center. Detailing and design of the prestressed concrete plant facilities were by George S. Pinter, consulting engineer for Precrete, Inc., manufacturer of the precast panels. Jack Abrahams is Precete's engineer at the site.

For the shopping center itself, I. M. Pei & Associates were the designers and Brugnoni & Boehler, the architects. John Darragh is the general superintendent for the George A. Fuller Co., the general contractor. Webb & Knapp Construction Co. is supervising the work in the field.

Research Center to Feature New Type Air-Conditioning

A new type of air-conditioning unit will be installed in the Borg-Warner Research Center on which construction has started in Des Plaines, Ill. The under-window unit is claimed to be more efficient and more compact than other units now available.

The first building of the center will contain about 40,000 sq ft of floor area. It will form the central section about which a 200,000-sq ft laboratory will be built. The other sections will be constructed as one-story wings attached to the initial structure.

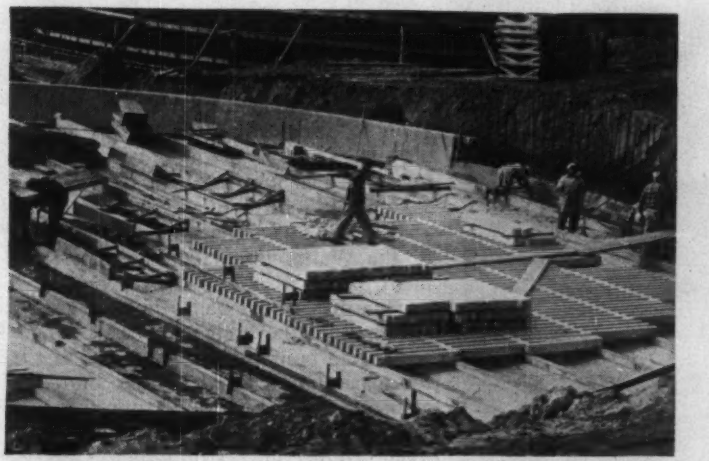
The air-conditioning unit was developed by Borg-Warner engineers, who utilized their experience in the aircraft and automotive industries. Key to the design is the heat exchanger. It consists of tubes connected "in parallel" to a header, which reduces friction losses compared with continuous-coil heat exchangers. The tubes have an oval cross section, to improve the efficiency of the exchanger even more.

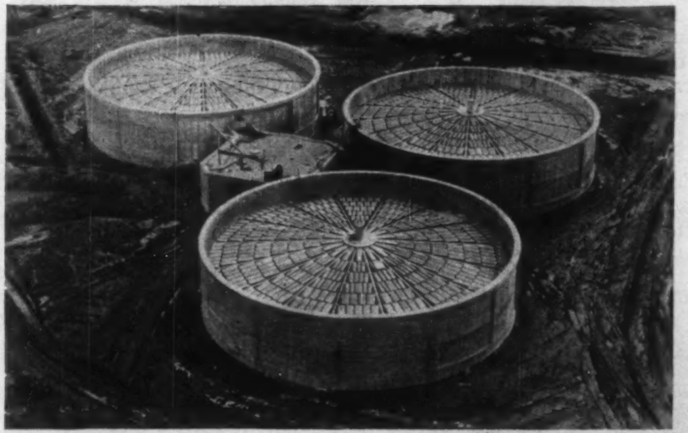
Record Pulp-Mill Expansion

Dominion Construction Co., Ltd., Vancouver, B. C., has been awarded a $40-million contract for expansion of MacMillan & Bloedel's pulp and paper operation at Port Alberni on Vancouver Island.

This will be the largest single pulp building-program ever undertaken in the Canadian province. One measure of its size is that 7,000 piles are being driven for the foundation of the main project.

Expansion will double present capacity of sulphate pulp, add a 180-ton general-purpose board machine and a 300-ton newsprint mill.





Precast
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offer many advantages for Modern Sewage Treatment Works

Precast concrete units are being used more and more in sewage treatment plant facilities. There's a good reason. Precast concrete units offer all the advantages of conventional concrete construction—plus speed, economy and easy handling. Here are typical recent examples:

FILTER UNDERDRAINS of the six trickling filters in the East Providence, R. I. Sewage Treatment Plant are precast, reinforced concrete beams (top photo). Because of concrete's great strength they could be used as cribbing to support the weight of the crushed traprock filter medium.

DIGESTER COVERS in the East Providence plant (second photo) are 2-in.-thick, tongue-and-groove precast concrete planks. Since concrete resists rot in a damp atmosphere, it was chosen over less durable materials.

Covers for the digester tanks of the Benton Harbor-St. Joseph, Mich. Sewage Treatment Plant (third photo) are short slabs of precast concrete that rest on purlins connecting radial girders. Crevices between slabs are calked with mastic. Triangular spaces between slabs and girders are filled with grout. Covers are 80 ft. in dia., rise 3 ft. from the outer edge to the center.

SLUDGE BED PLANKS AND POSTS in Elmira, N. Y. Sewage Treatment Plant are precast concrete units (bottom photo), part of a million-dollar plant addition. Durable precast concrete units can withstand a lifetime of weathering and freeze-thaw cycles in such installations.

Precast concrete construction is moderate in first cost, requires little maintenance, serves for years. The result is ***low annual cost,*** the real measure of the economy of any construction.

For more information, write for a free illustrated booklet, *"Sewage Treatment Works."* It is distributed only in the United States and Canada.

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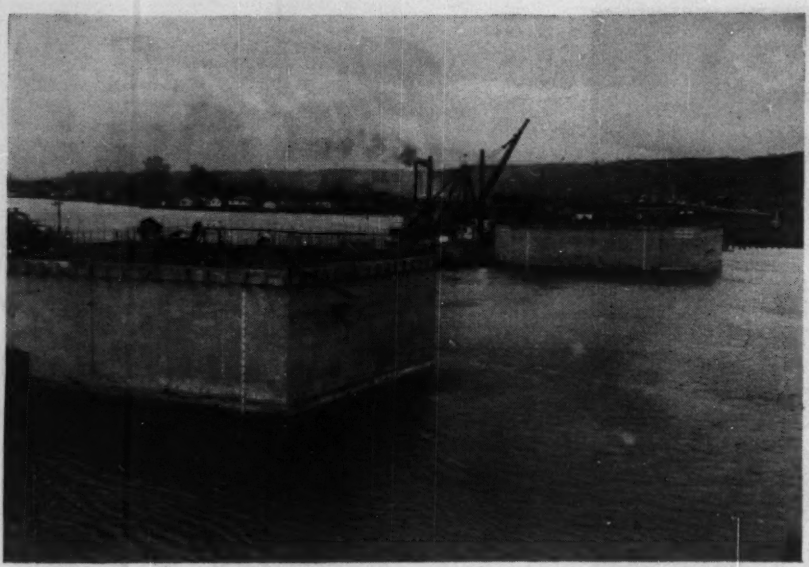


TOWED to the site from a graving dock downstream, these two bridge piers are actually parts of one structure. Concrete has still to be added on top.

Boxes Buoy Bascule Bridge

A $6.5 million bascule bridge across the Duwamish River at First Ave. S. in Seattle will be supported on two reinforced concrete cellular piers that are 85% buoyant. The piers were built in a single unit, with connecting struts, in a downstream graving dock and towed to the site, where they were permanently anchored.

The buoyed-up piers were decided upon by the Seattle city engineering department (ENR Dec. 23, 1953, p. 23) because of the unstable river bottom, which consists of fine, black sand on top of soft clay and could not support a conventional pier. Although weighing 19,000 tons, the boxes will impose a burden of only 1,000 psf on the river bottom.

Each pier is 95 ft 6 in. by 59 ft 6 in. in size. Most unusual feature is that they are connected below the channel bottom by two reinforced concrete cellular struts 12 by 16 ft 9 in. and 244 ft 1 in. long, joined by three 8x12 ft cross struts. The longitudinal struts will keep the piers in alignment and permit operation of the double bascule, even in the event of an earthquake.

• Pier details—Each pier has 24 cells, or compartments, each about 14x15 ft in size. The bottom slab at El −64.0, is 1 ft 5 in. thick, with other slabs at Els −52.0, −34.5, −17.0 and −2.5, diminishing in thickness to 9 in. Outside walls range in thickness from 1 ft 4 in. to 5 in. All interior walls are pre-cast, 9- to 12-in. thick, with bottom steel tied into the slab steel.

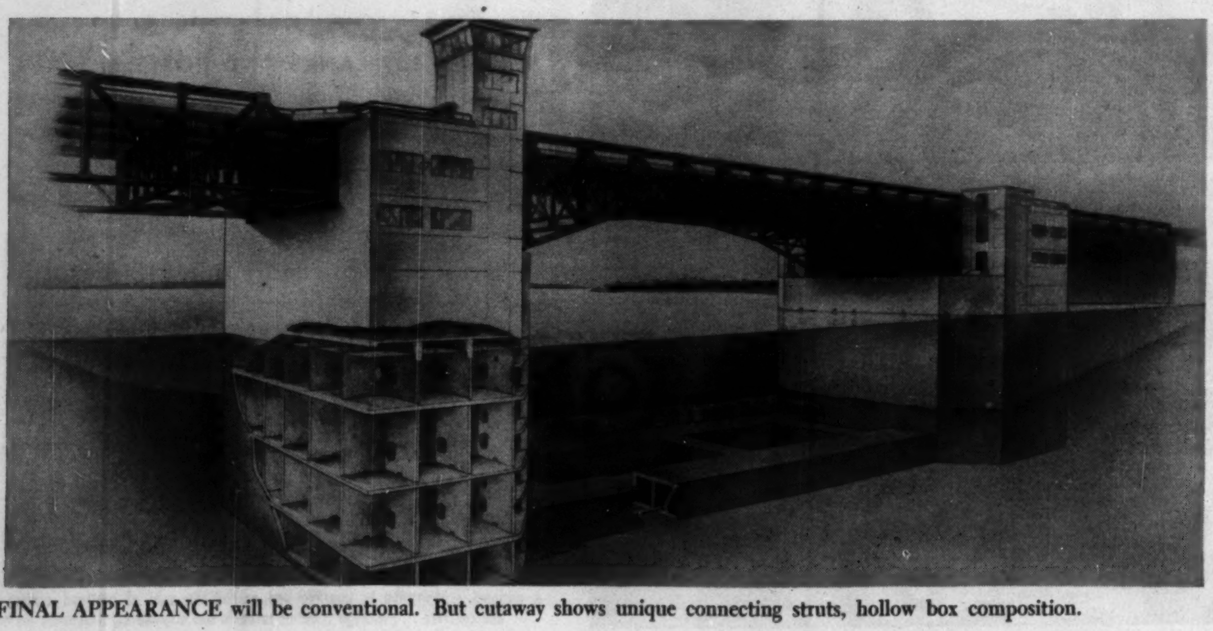
General Construction Co., awarded a $1.4 million contract for the piers by the Washington Highway Department, began work late last year in its graving dock about half a mile downstream from the bridge site. Exterior walls were built to a height of 27 ft, the maximum height which the buoyancy of the structure would support.

The structure—complete with the long connecting struts—then was launched and towed upstream early this year by four tugs, and temporarily anchored, upstream from the bridge site, to four 55-ton concrete blocks, which had been cast in the same graving dock.

Before final positioning of the pier structure was carried out in June, the two shafts were built up another 40 ft, and the river bottom was dredged to grade, at El. −64.0. The first positioning attempt failed when the river, swelled by melting upstream snow on the warmest day in some 15 years, filled the dredged area with silt in a few hours.

Later, after the river had subsided, the area was dredged again, to a depth of 2 ft below grade, and 24 piles were driven to support each pier shaft temporarily. Each pile was designed to support a 30-ton short-time load.

• Placing—The pier structure, maneuvered by six-way cables from a winch on each shore, with assistance from two tractors, was placed above the piling and lowered into place within a



FINAL APPEARANCE will be conventional. But cutaway shows unique connecting struts, hollow box composition.

tolerance of 1 in. The final positioning began at midnight on an outgoing tide and was completed at 5:30 a.m., when the last of 1,000,000 gal of water was pumped into the structure to serve as ballast. The bottom slab, which had been 10 ft off the bottom, now was supported on the piling, at grade.

Depth of water in the lowest tier of cells in the two shafts and in the struts was held to 11 in., to avoid undue strain on the struts during positioning. Balance of the necessary gallonage was pumped into the second tier of cells.

After the pier structure had been placed on the piling, material dredged from upstream was dumped and swept into the opening under the structure, first by tidal action and later by jets from the dredge. Finally, grout of sand and cement was pumped through fifteen 2-in. pipes extending down through each pier shaft, until the cavity below the structure was completely filled. Backfill also was placed over the connecting struts, to restore the channel to its original depth.

• **Weight added**–After the piers were positioned on the river bottom, water was pumped into the shafts in sufficient volume to simulate the load the piers will carry when the bridge is completed. As the piers are built up to their 140-ft eventual height and the bascule leaves are installed, the water will be drained out until it reaches its permanent ballast level of 13.4 ft within the structure at low tide.

At high tide, this depth of water within the structure will be more than doubled. Flooding ports at extreme low tide level, El −17.0, allow a flow of water in and out of an impounding chamber. As the tide rises, water flows into the tidal chamber above, balancing the tendency of the rising tide to lift the piers. At high tide, 60 ft of the shafts of the 19,000 ton structure will be below the level of the water. Without the water, the structure would lack only 9 ft of draft to be buoyant.

• **Concrete work**–The General Construction Co. contract calls for construction of the piers to approximately El 17.0, after which the Alton V. Phillips Co. will build them to their ultimate height and install the bascule leaves under a $1,273,000 contract. Separate contracts also have been awarded for the approaches, with Peter Kiewit Sons' Co. holding a $665,000 contract for the north approach and Roy T. Earley Co. a $1,009,000 contract for the south approach. N. Fionto Co. holds a fifth contract in the amount of $261,000 for grading approaches, access roads and detour roads.

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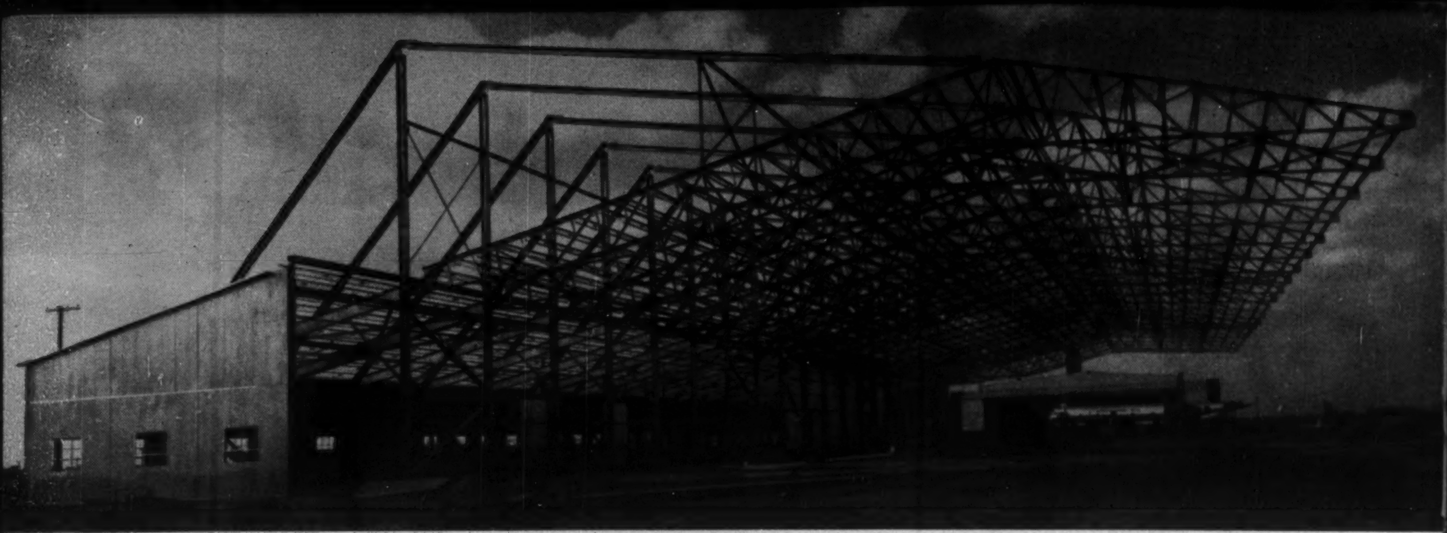
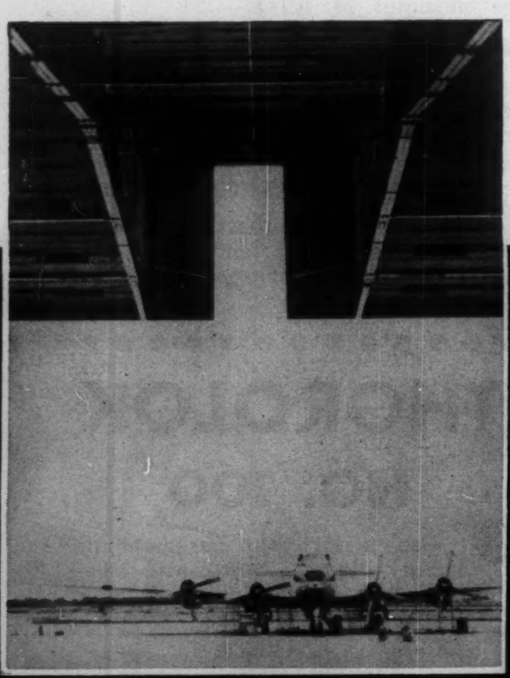
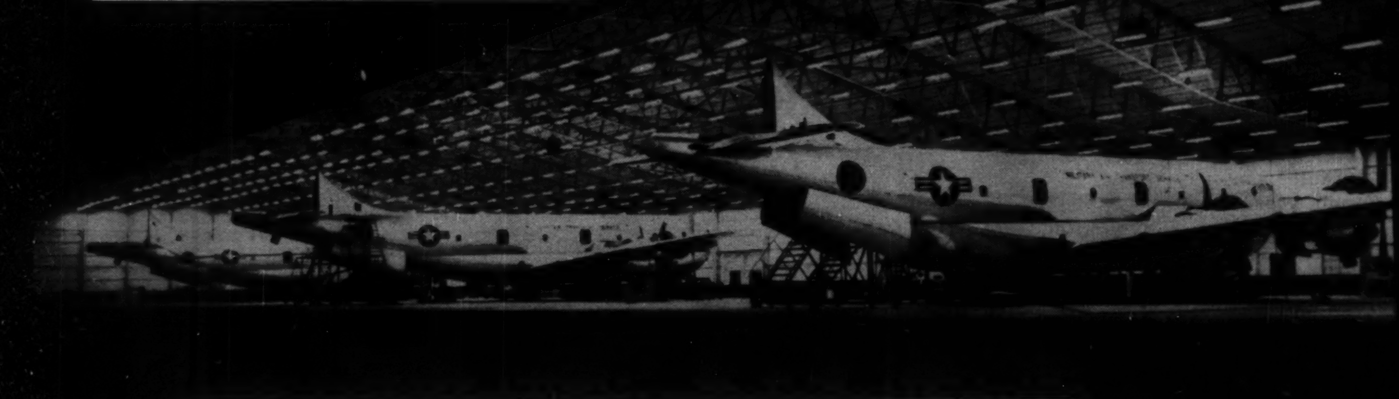


The 76-foot-long member which connects the top ridge of the cantilever to the top of the inner column is designed to act either in tension or compression—supports weight of roof loading, and withstands 30 psf uplift from wind under roof.

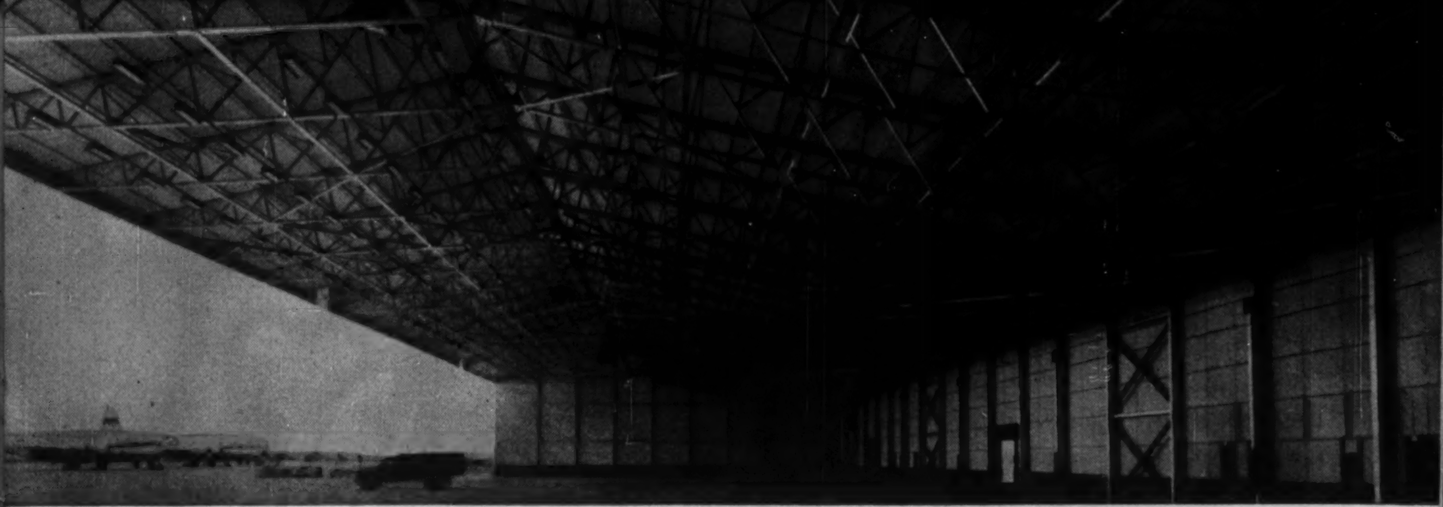
Ingenious hangar



Vertical clearance rises to 45 feet inside the three tail housings which open at the edge of the overhanging roof to admit the tails of these Boeing Stratocruisers.



The unique hangar was designed and constructed by the Erwin-Newman Co., of Houston, Texas, under their design patent No. 2,687,102.



The hangar is designed for 25 psf roof load and 15 psf horizontal wind force. Rear columns are bolted to deep concrete piers since they must withstand a pull of 14 tons per column from the weight of the cantilevered roof structure, which amounts to only 11.8 psf.

has no columns...

cantilever construction spans 120 ft. at cost of only $2.40 per sq. ft.

• The hangar area of this efficiently-designed building of Temco Aircraft Corporation at Greenville, Texas, is completely unobstructed by supporting columns. The clear area measures 120 ft. deep x 432 ft. long x 30 ft. high.

The roof is carried on 120 ft. steel truss cantilevers, connected by means of rocker joints to 56 ft. tall inner columns, which in turn are joined to 19 ft. outer columns placed 40 feet farther back. The space between the two rows of columns is conveniently used for workshops, parts storage, and offices.

The prefabricated Structural Steel framework for this hangar was bolted together in *only six working days*. The framing cost $2.40 per sq. ft. Framing and roofing cost $3.26, and the complete building including services, foundations, and 32,400 sq. ft. of concrete apron totaled $5.06 per sq. ft. Approximately 1,000 tons of Structural Steel were used in the building framework. Speedy construction was an important factor in holding down costs.

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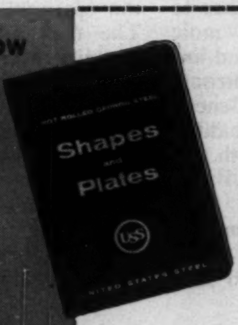

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The Dalles Dam

First power from an initial capacity of 1,122,000 kw (14 units) is expected to be on the line at The Dalles late in 1957. It will probably be the last major Columbia River dam that is entirely a Corps of Engineers project. Two additional authorized dams—John Day and Priest Rapids—may be built as partnership projects.

Work at The Dalles has been divided among several large contracts. Some phases of the earlier work were described in ENR, Oct. 22, 1953, p 29 and Jan. 6, 1955, p 36.

Hydraulic model proved feasibility of method . . .

Taming the Columbia at The Dalles

Bids for the last major contract of the Dalles Dam were opened in Portland, Ore., Sept. 20. Low bidder with a bid of $4.3 million was Atkinson-Ostrander Co.—a joint venture of Guy F. Atkinson Co. and Ostrander Construction Co. that has three other major contracts on the work totalling $46 million.

The contract will include a spectacular underwater rockfill dam construction operation. Some 700,000 cu. yd. of the 2,250,000-cu. yd. rockfill closure structure will be dumped underwater. And the Corps of Engineers designers expect the resulting fill to have less than 200 cfs. leakage. The river closure at The Dalles differs from most other large dams in that the closure fill will form part of the permanent dam structure.

Bidding on the work was almost as spectacular as the job promises to be. Atkinson-Ostrander were more than $1 million below the second low bidder—a joint venture of Morrison-Knudsen Company, Inc. and General Construction Co. Four other bidders ranged up to $6.7 million with the government estimate being $5.1 million.

Atkinson-Ostrander were generally lower on most bid items. But it was on the major items of rock and sand moving that their bid was substantially low. Atkinson-Ostrander bid $1.18 per cu. yd. on quarry run rock and rock spalls, $0.88 per cu. yd. on embankment blanket material and $0.84 per cu. yd. on removal of embankments. The second bidder's figures on these three items were $1.30, $1.57 and $2.00 respectively. Estimated quantities were 1,350,000 cu. yd. of quarry run rock and rock spalls, 658,000 cu. yd. of embankment blanket material and 330,000 cu. yd. of embankment removal. Thus, on these three items alone, Atkinson-Ostrander was $1 million lower than the second bidder.

• Underwater rockfill—The planned closure dam includes a mass section of extra-large quarry-run rock plus succeeding layers of finer material on the upstream face for watertightness. The rock mass will be formed by dumping over the top of the fill as it is built out from the Oregon shore. Model studies (see box) have demonstrated feasibility of building such a fill with rock averaging 500 lb in weight in river flow up to 200,000 cfs.

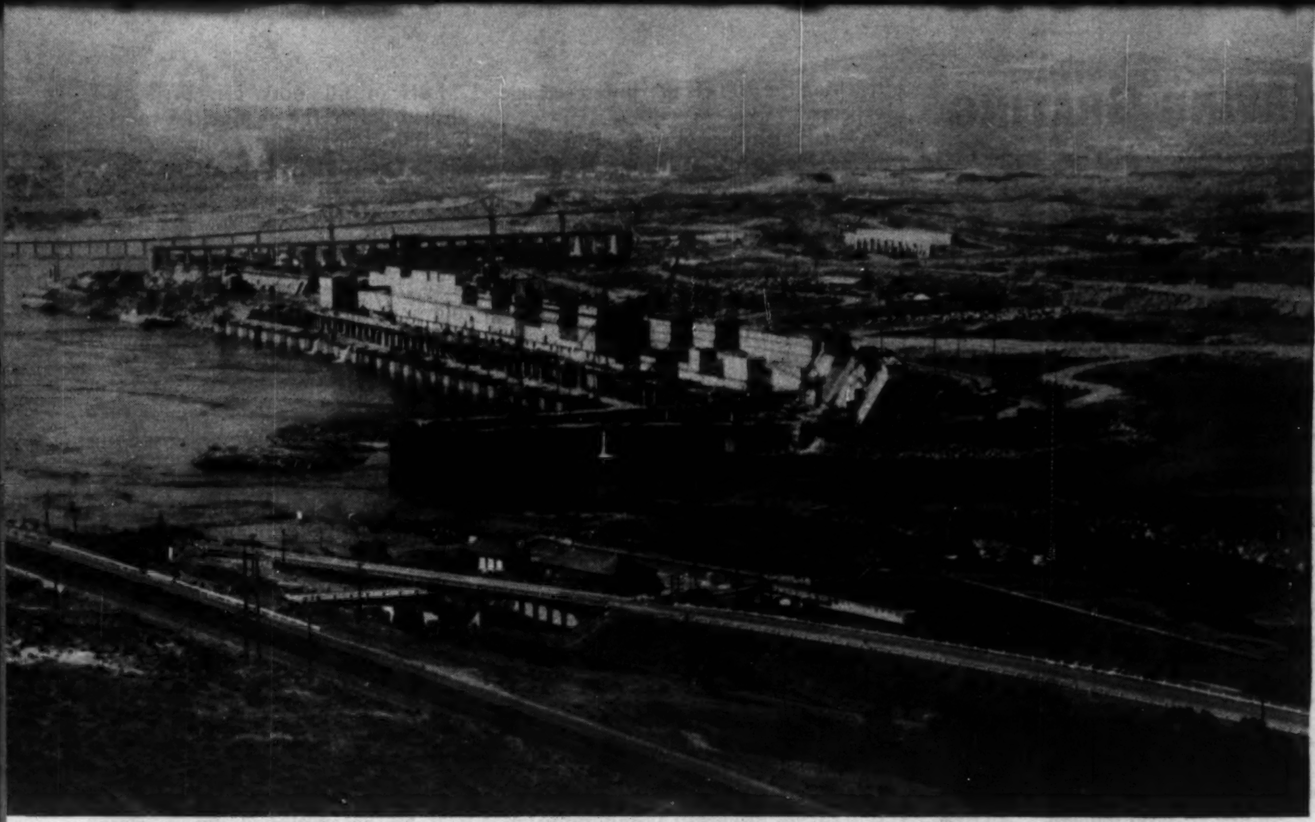
The dam's underwater section will reach water depths in excess of 150 ft, well below sea level. With river flow 200,000 cfs, water surface after closure is expected to be El 87. Thus, plans call for the dam from El 90 to El 185 to be built in the dry by normal rockfill dam placing methods.

Model tests confirmed feasibility of the plan. When large sized rock is dumped in the water near the upstream face of the fill, almost all of the rock will reach a position within the limits of the dam section. There may be some loss of rock, but it is expected to be minor.

Nothing in plans or specifications holds the contractor to a specific method of rock placing. But it is expected that the method developed by the model studies will be used. Thus, the fill will gradually be built out from the Oregon shore to close the 600-ft wide channel.

• Will the rock stay put?—Two major questions might occur to experienced dambuilders. How will they get rock of the required size? And why won't the current be strong enough to carry 500-lb or even 1,000-lb rock away? At McNary Dam on the Columbia, closure was made by use of highline-placed, precast-concrete tetrahedrons weighing 12 tons. And even then it was touch and go to make the closure.

The Dalles is surrounded by thick basalt formations that result from pre-



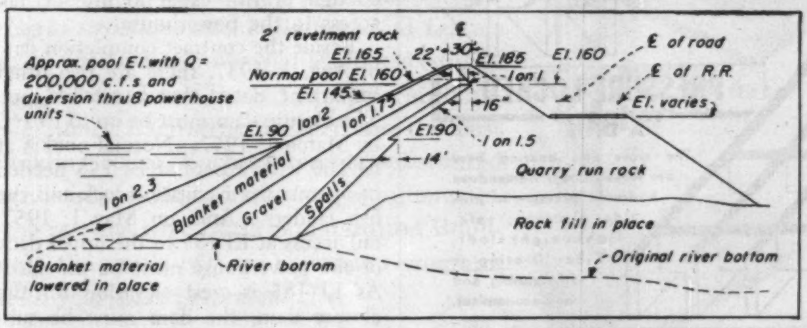
. for contractors bidding on closure of The Dalles Dam. Resulting . . .

. . . plug near Oregon shore must be permanent.

historic lava flows. With proper quarrying, the material will easily break into large size pieces, 500-lb and bigger. It is available within a half-mile haul of the dam.

Current is not the same problem as The Dalles. At McNary, the river had to be raised several feet before any water went over the low sections of the spillway that handled the river after closure. At The Dalles, on the other hand, the river will flow through eight bays in the powerhouse even while the closure dam is being built and the construction cofferdams are being removed. Sill level of the low powerhouse bays is El 58. If river flow is 100,000 cfs, water surface before closure will be El 75. Thus, as soon as the stoplogs are removed from these low powerhouse bays, about 25% of the river flow will be passing through the powerhouse. Although the upstream river level will be raised some 5 ft during the closure procedure, additional water will flow through the powerhouse every time a load of rock is dumped into the river.

At McNary, the closure was part of a cofferdam surrounding powerhouse construction, in a straight line across the river. At The Dalles, powerhouse and spillway are built on a shelf beside the river for a minimum of cofferdamming. The river has been flowing in a deep channel near the Oregon shore which the closure dam will block. Depth is so great that it is infeasible to build a cofferdam for this final section of the project. The closure dam must become a permanent part of the structure.


2' revetment rock
℄
22'
30'
El. 165
El. 185
El. 160
℄ of road
℄ of R.R.
Approx. pool El. with Q = 200,000 c.f.s and diversion thru 8 powerhouse units
Normal pool El. 160
El. 145
1 on 1
16"
El. varies
El. 90
1 on 2
1 on 1.75
El. 90
1 on 1.5
14'
Quarry run rock
1 on 2.3
Blanket material
Gravel
Spalls
Rock fill in place
Original river bottom
Blanket material lowered in place
River bottom

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• What about watertightness?—Once the underwater rock mass is in place, there remains the problem of making it watertight. First of the upstream layers is a 30-ft thickness of rock spalls, quarry rock having 12-in. maximum size and 20-55% by weight passing a 3-in. screen. Next a thick layer of gravel will go in. At El 90, the gravel blanket thickness will be some 30 ft and at river bottom level it will be about 60 ft thick. Pit run gravel will be used coming from natural deposit some three miles upstream. It is not expected that the contractor will have to process this gravel to any great extent. The deposit runs 75-80% coarser than ¼ in. with about 4-6 in. maximum size.

Finally, a layer of blanket material will cover the face of the dam. The blanket material which comes from a different nearby deposit of good natural material is sand with 31-54% smaller than #4 mesh. The underwater section of the blanket is expected to vary from about 40 to 70 ft in thickness.

The blanket material is expected to be sealed by natural river silt thus

(*Continued on page 46*)

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reaching the 200 cfs maximum seepage expected.

Total quantities of material involved in the closure dam include 1,300,000 cu yd rock; 300,000 cu yd gravel; and 650,000 cu yd blanket material.

• **Time limitations**—Work must proceed according to a strict time schedule: fill must be placed during low flow season (October to March); river cannot be blocked during fish run period (ending about October 1); rail access to the powerhouse is needed across the closure dam at the earliest possible date.

This means that no work can be done in the main channel until Sept. 20, 1956. And the river closure must be made and rail access to the lower deck of the powerhouse provided by Jan. 15, 1957. In the four months between those dates there will be a burst of activity in placing the fill in the river channel.

A minor complicating factor is the existing Dalles-Celilo navigation canal. This canal will be replaced by navigation lock facilities being constructed on the Washington shore as part of The Dalles project. As minimum interference with navigation is desired, the canal must be kept in operation until Jan. 1, 1957. That leaves the contractor only 15 days to fill in enough of this canal to provide rail access to the powerhouse.

Beside the contract completion date of Aug. 1, 1957, there are two other important dates that must be met. The closure dam must be up to El 165 by March 1, 1957. Normal pool is at El 160 with a pool at El 155 needed to operate the navigation lock and the fish ladders. And, on May 1, 1957, rail access at El 185 to the upper deck of the powerhouse must be provided. As El 185 is crest elevation for the closure dam, the dam must be substantially complete by that date. Each of the major time deadlines carries a $4,000-a-day penalty.

Lots of fill work can be accomplished before the channel is available for filling operations. Almost all of this is along the Oregon side. Some 860,000 cu yd is expected to be in place before the struggle with the river begins. Part of this is in a river water section apart from the main channel. Here the contractor can test his river dumping methods. In so doing natural angle of repose of the various materials can be determined.

All of this assumes a river flow of less than 200,000 cfs during the time work is under way on the closure. This is a relatively safe assumption as 75 years of hydrographic records show an average flow of about 100,000 cfs during the October through February period. But there have been isolated instances of flow reaching better than 350,000 cfs for one or two days. Should the flow exceed 200,000 cfs, the contractor will be asked to cease filling operations. This will result in adjustment of the time deadlines in proportion to the shutdown period.

• **Underwater TV**—Some of the inspection of the underwater rock work will be accomplished by a closed circuit underwater television camera. First use of this system was made by design engineers recently when they suspected that the river channel bottom was not scoured clean as reported by a diver during a 1948 inspection. The TV camera operated from a barge disclosed a boulder deposit at about the point of the upstream toe of the closure dam. To seal this boulder mass, gravel and blanket material will be lowered in bottom-dump buckets. This will be the only underwater fill not made by dumping at the water surface except for a final zone of blanket material that will be lowerd in place on all of the blanket material placed by dumping from the surface.

Other inspection methods will include sonic depth sounders and the usual lead lines. And there may be

The Dalles Dam—Major Construction* Contracts

Contract	Contractor	Cost (millions)	Completion Date	% Complete Aug. 31, 1955
Powerhouse excavation and cofferdam	S. A. Healy Co.	$5	Jan. 13, 1954	100
Spillway Dam	Atkinson-Ostrander	14	Dec. 31, 1955	93
Powerhouse, Units 1 to 14	The Dalles Powerhouse Constructors	30	Jan. 2, 1956	95
Powerhouse, Units 15 to 22	Atkinson-Ostrander	19	Apr. 15, 1956	77
Navigation Lock	Atkinson-Ostrander	13	Oct. 1, 1956	40
Powerhouse superstructure	Montag, Halvorson, Cascade, Austin	13	July 1, 1958	29
Closure dam and cofferdam removal	Atkinson-Ostrander	4	Aug. 1, 1957	0

* Relocation and minor contracts totaling $8.3 million still under way. Supply contracts including turbines, generators, and gates exceeding $40 million have been awarded.

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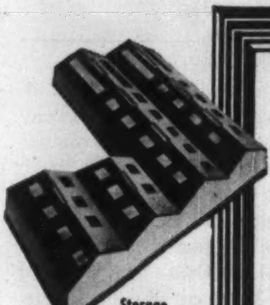

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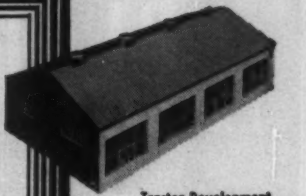

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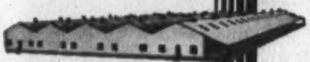

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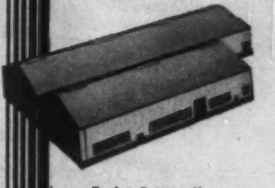

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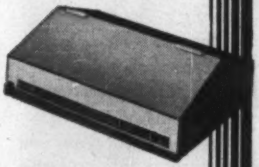

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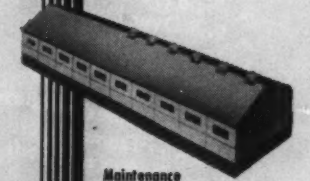

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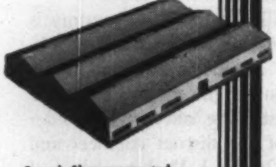

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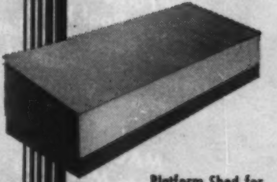

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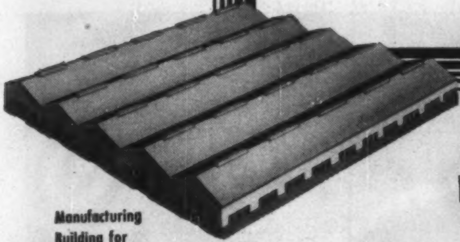

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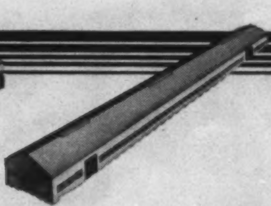

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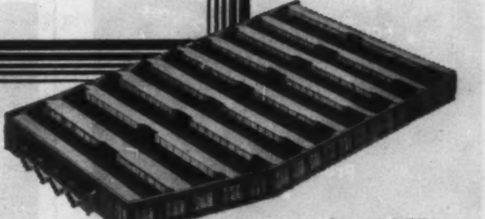

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occasions where divers will have to be sent down to look at the fill.

The Dalles Dam is a project of the Portland District, Corps of Engineers. District engineer is Col. Jackson Graham, who has recently replaced Col. James U. Moorhead. Design carried out under the direction of Paul Thurber, chief of the foundation and materials branch. John Kemple is chief of the construction division, and H. B. Elder is resident engineer at the dam.

Design Aided by Hydraulic Model Studies

Feasibility of a closure method for The Dalles Dam was demonstrated by model studies at the Bonneville Hydraulic Laboratory, Bonneville, Ore.

Closure research was carried out on an undistorted model, built to 1:40 scale. Purpose of the research: (1) to determine method of placing rock in the river and (2) to find out what size rock would be needed. Hydraulicians have established through earlier work that there is a linear relationship in rock sizes between model and prototype; no adjustment has to be made in density of the model size rock.

Tests were made with quarry-run rock that in full scale would be up to 1,000 lb in weight and from 3 to 30 in. in size. This rock was found to be good for either the end placement or horizontal lift method.

First research on method was on the horizontal lift procedure, by which the closure dam would be built across the full width of the channel, gradually raising its crest until it rises above the river surface. Two methods of placing were tried: dumping by a high line and dumping from barges. Both methods proved feasible. But the cost and time for the end placement method was considered to be less. In the case of a high line, space is available for only one line. Thus processing rock by this method would have been laboriously slow. And in case of dumping from barges, space would have been limited and barge anchorages uncertain during high water. Big advantage of end placing is that, once the fill is part way out into the river, the contractor can work on other parts of the filling procedure needed for river closure.

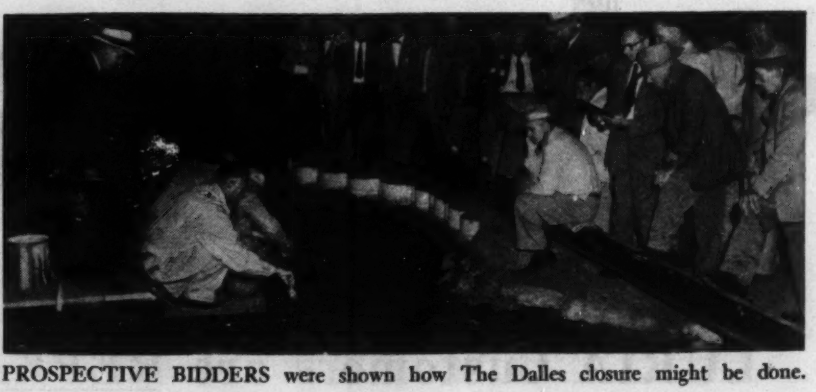
To show prospective bidders just how the end dump method would work the model was operated for groups of contractors on three days in late August, four weeks in advance of the bid date. And the model will be available for research by the successful bidder should he want it. All other models on The Dalles work are available in this same manner for contractors working on the project.

Biggest model now in existence at the Bonneville Hydraulic Lab is a 1:80 scale model of a 3-mile section of the Columbia River at The Dalles Dam. This was used for research on alignment of structures, required height of cofferdams, excavation problems, and general flow conditions. Perhaps the greatest saving in construction cost at The Dalles Dam resulted from a study of forebay excavation made on this model. Original plans called for excavating rock in the powerhouse forebay to El 70. The model study showed that the rock could be left at El 100 with no impairment of the hydraulic characteristics of the powerhouse and spillway. This in itself saved 1,500,000 cu yd of excavation.

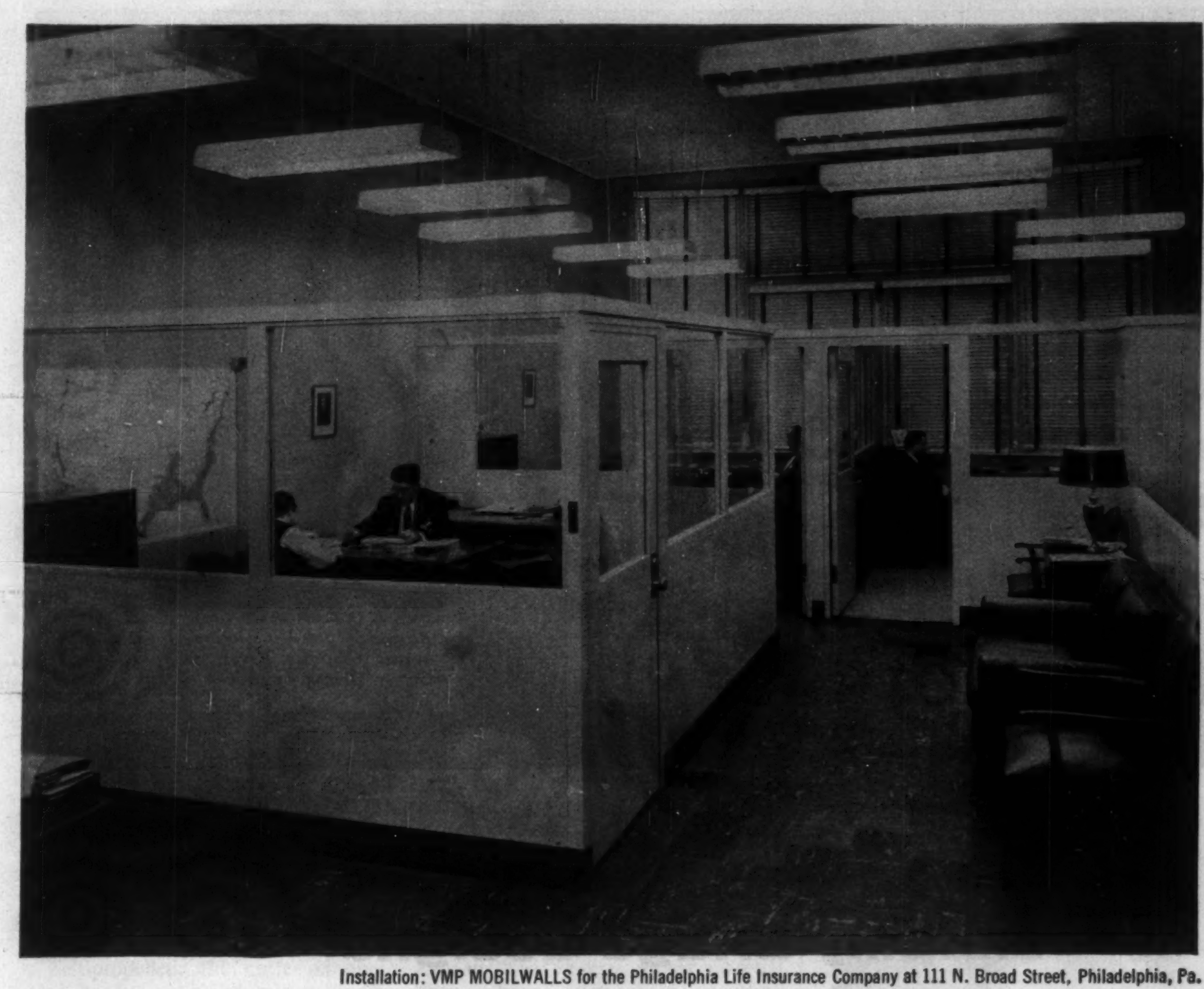
Other model studies include:

a. Spillway and stilling basin characteristics
b. Hydraulics of the navigation lock
c. Navigation lock approaches
d. Approach flow to the powerhouse
e. Powerhouse fish collection system
f. Effect of pressure reductions on mortality of fingerling salmon (this permitted use of one piece spillway gates with significant cost savings in initial installation and in operation)
g. Surge action effect on fish
h. Navigation and fish passage facilities required during construction.

The Bonneville Hydraulic Laboratory is under the supervision of the Portland District, Corps of Engineers although doing work on Corps of Engineers projects in the entire Northwest. The laboratory is under the direction of the district engineer and is administered by M. J. Webster, chief of the hydraulics section of the design branch of the Portland District. Harry P. Theus is director of the laboratory.



PROSPECTIVE BIDDERS were shown how The Dalles closure might be done.



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Contractor: Fleming Company, 1717 Sansom Street, Philadelphia 3, Pa.

"VMP MOBILWALLS helped me meet a tight construction schedule"

Prompt delivery counts. This compliment from Charles J. Fleming, President of the Fleming Company, Philadelphia building construction firm, expresses the satisfaction that contractors feel when they deal with VMP. They can depend on fast deliveries. VMP MOBILWALLS always fit. No time is lost in erection with local VMP crews on the job.

VMP's metal movable MOBILWALLS slash installation time, keep that new look for years. Contractors everywhere are getting the word about the businesslike spirit behind VMP's erection and service crews. And warehouses have big stocks of metal MOBILWALLS available for immediate delivery.

Also, VMP works closely with the contractor . . . bidding with good sharp prices . . . giving expert attention to new and remodeling projects. Get the facts about VMP; write Dept. ENR-10 for VMP MOBILWALL catalog showing the variety of partitions available.

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Subsidiary of Chesapeake Industries, Inc.

All-welded 100-foot Vierendeel span across Umpqua River, Douglas County, Oregon.

All-welded Vierendeel spans simplify bridge designs

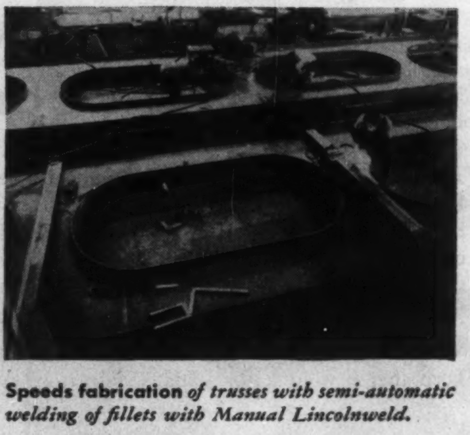
FOUR spans incorporating all-welded Vierendeel girders provide simple, economical construction for three new bridges in Douglas County, Oregon.

Typical of construction is the 100-foot span shown above that provides a 19-foot, 6-inch clear roadway. The girders are 6 panels each with lower and upper chords 27-WF-94 beams. Floor beams are 24-WF-76 beams supporting five 12-inch stringers. Deck is open mesh steel.

Fast, low-cost shop fabrication of girders is accomplished with Manual Lincolnwelding of fillets in granular flux after tack welding with hand electrodes.

Construction of the three bridges supervised by Floyd C. Frear, Douglas County Engineer.

Studies in Structural Arc Welding available to bridge engineers and structural designers. Write on your letterhead to



Speeds fabrication *of trusses with semi-automatic welding of fillets with Manual Lincolnweld.*

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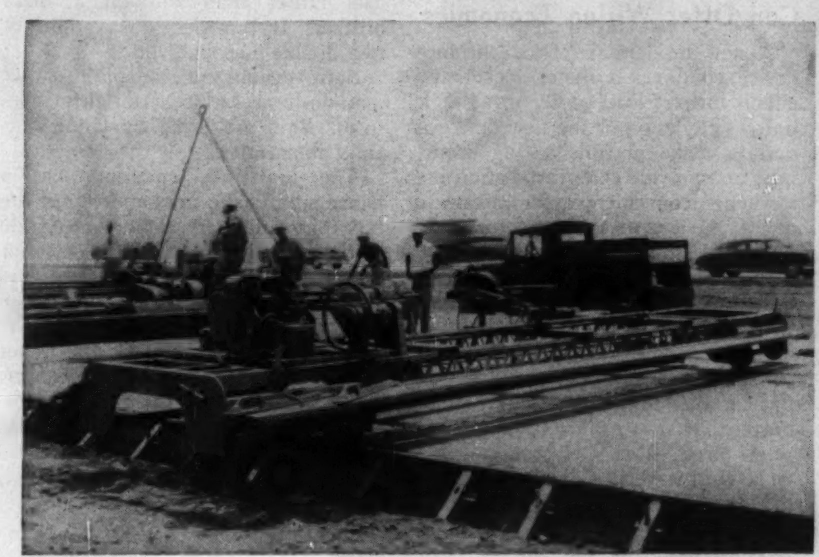
NEW PRODUCTS



VIBRATING joint cutter reduces sawing time, cuts volume of filler required.

Joint Cutter Also Cuts Costs 70-80%

The next time a concrete paving contract comes up you might do well to look into the potentialities of the Vibro-Joint Cutter. According to the manufacturer of this unit, it combines the best qualities of hand-formed joints with those of sawed joints and at the same time effects substantial savings in costs.

Self-propelled, the cutter is operated by one man and follows immediately behind the longitudinal finishing machine. As it reaches the joint location, a T-shaped cutter bar is hydraulically lowered into the fresh concrete. As it enters, the bar is vibrated mechanically to cause the aggregates to separate. Continued vibration as the bar is lifted causes sand and cement mortar to be pulled back into the crevice formed. Hand finishers then take over to smooth the joint with their floats.

Although the finished surface shows no evidence of the machine's action, the aggregate remains parted and a few hours later the joint may be sawed. And here is where the action of the machine becomes most apparent. First, only a 1-in. cut needs to be made—compare this with the usual requirement of $\frac{1}{6}$ the slab thickness. Second, since a weakened plane has been created due to the parting of the aggregate, inexpensive fiber abrasive blades may be used.

The result is a reported savings of 70 to 80% over orthodox sawing methods. In actual figures it means a joint cost of 6 to 8¢ a ft—including the cost of operating both the Vibro-Cutter and the concrete saws. These costs are based on actual operational experience in the Southwest and include labor, depreciation, maintenance and insurance expenses.

Another and obvious saving is the high reduction in the amount of joint filler required. On a 16-in. slab basis this method requires $\frac{1}{3}$ less material than a typical T/6—$\frac{1}{6}$ slab depth—sawed joint and $\frac{2}{3}$ less than a typical T/6 hand-formed joint. With joint filler prices running as high as 30¢ per lb, this is not an item to be overlooked.

A pilot model of the joint cutter has undergone testing at Abilene AFB in Texas under the supervision of the H. B. Zachry Co. of San Antonio. In this area of hard, abrasive aggregate, the company reported savings of up to 75% through use of the new method.

The first production model was sold to Pavement Controls Co., Inc. of Cleveland, Ohio. This company, which specializes in subcontracting the joint sawing and filling from the general contractor, has used the cutter at the Plattsburg AFB, Plattsburg, N. Y.

At present, two models of the machine are available. Model #25 is adjustable from 20 to 25-ft paving widths; Model #12 is adjustable for 12 to 13-ft pavings. Models of odd widths will be made available on special order. Delivery on standard models is approximately four weeks. THE VIBRO-JOINT CO., INC., COMMERCIAL BLDG., 1104 MAIN ST., DALLAS, TEX.

(New Products continued on page 52)

IT Costs Less TO Build Better WITH THIS Anco PAIR!

STRONGER . . . ⅝" dia. ANCO Structural Rib Bolts are stronger than ¾" dia. rivets. Shear and bearing values are greater than hot driven rivets. Minimum tensile strength 70,000 lbs. per sq. in.

FASTER . . . easier to install ANCO Rib Bolts and Lock Nuts. No special wrenches, pneumatic equipment, rivet guns or heat required in the field.

CHEAPER . . . just two unskilled men with a hammer and ordinary wrench make an ANCO installation team. No costly replacement of condemned rivets. Less expensive than any other type of bolted construction.

Anco STRUCTURAL RIB BOLTS

Carbon Manganese Steel. Standard A.B.M.A. Button or Countersunk Head. U. S. S. rolled threads. Simply hammer into place and it's ready to accept nut.

Open Hearth Carbon Steel. Guaranteed to break bolt in destruction test. Automatic Locking Feature, of Chrome Vanadium Steel with high percentage of Nickel, is integral part of Nut. Fits Standard Machine Bolts, too.

Anco LOCK NUTS

ANCO Structural Rib Bolts and ANCO Lock Nuts are finished Black, Galvanized, Cadmium Plated, etc. Galvanized to meet A.S.T.M. Specs.—hot dipped and subjected to Preece Tests.

ANCO Structural Rib Bolts and ANCO Lock Nuts are Approved and Used in All Types of Steel Construction; Buildings, Bridges, TV and Hi-Tension Towers, Oil Refineries, Hangars, etc.

ANCO Lock Nuts are also used on Standard Machine Bolts for bolted construction.

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The FINEST in SURVEYING EQUIPMENT

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120 Grand St., White Plains, N. Y.

Service Entrance Devices Can Offer Wiring Economies

A new residential service entrance device combines a meter socket and circuit breaker load center in a single unit. The design of the new device is said to make possible wiring economies and provide extra installation and servicing convenience for areas in which the electrical contractor is required to supply the meter socket.

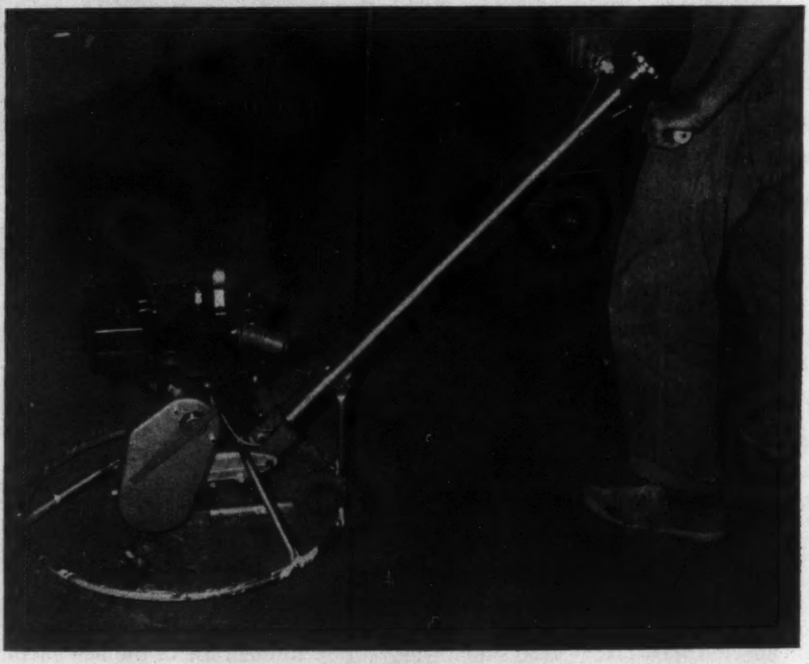
Two versions of the combination unit are available. One has a 50-amp, two-pole, common-trip main breaker wired in and provides six branch circuits; it can utilize one other two-pole breaker besides the wired-in main breaker. It is rated for 120/240-v ac, single-phase, three-wire service.

The other version is similar except that it is an eight-circuit device with mains rated at 70 amp, and the meter is wired directly to the load center bus bars rather than through a main breaker. It provides a maximum of two double-pole branches.

Both versions are available in either semi-flush or surface raintight enclosures. Both are listed by Underwriters' Laboratories.

The semi-flush enclosure has a flange around the sides and top of the box that can be nailed to the outside of the wall studding; then, the exterior building material, such as lath and stucco, is applied around the enclosure, and over the flange, leaving the raintight front portions of the meter socket and load center protruding through the wall. This allows for external installation of the meter and load center. Knockouts are located behind the flange and all wiring is concealed in the wall.

(*Continued on page* 54)



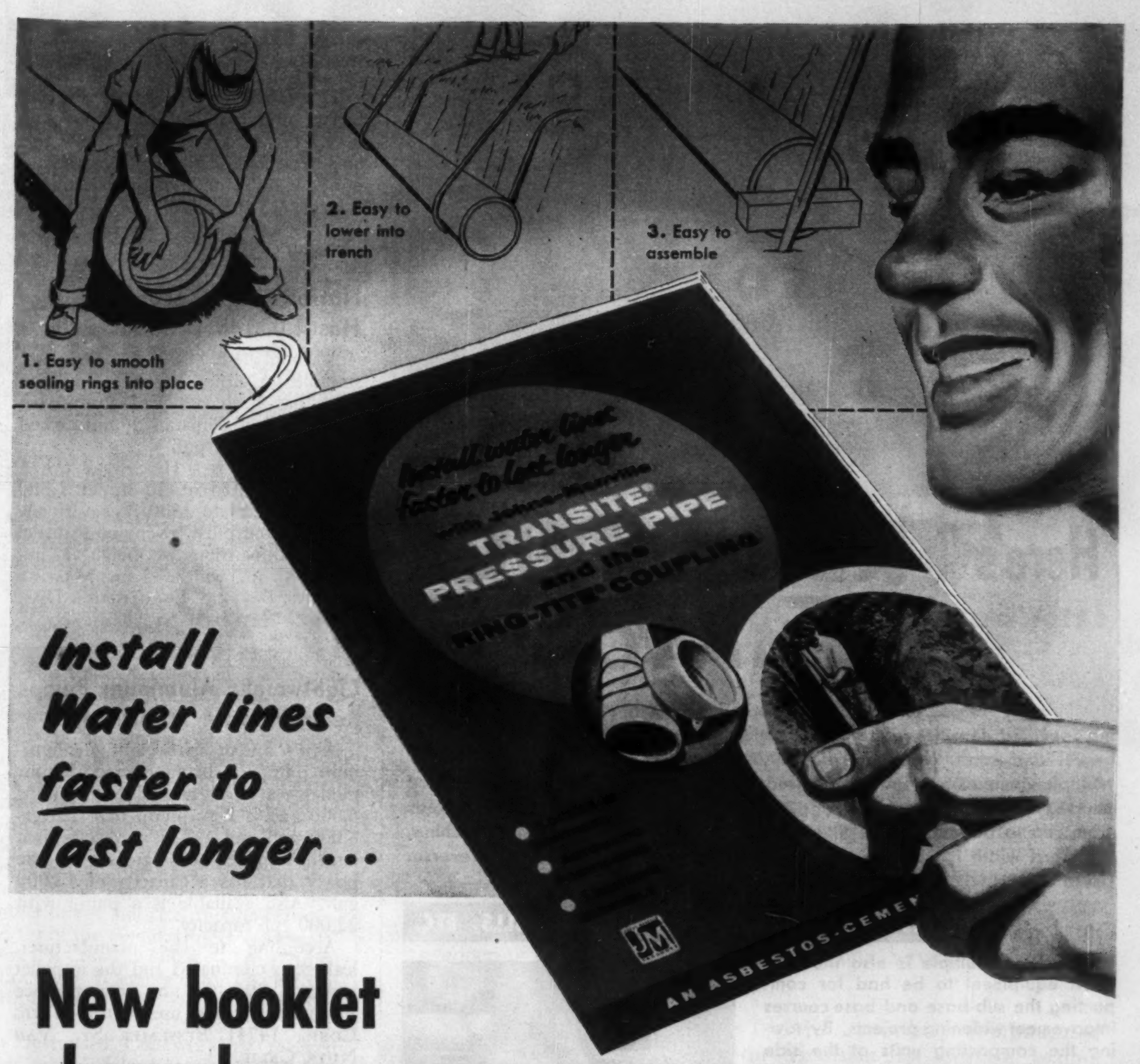
24-in. Trowel Is a Safe Lightweight

A new lightweight 24-in. rotary trowel, Model G24, weighs only 69 lb and can be moved around the job by only one man. Also, because of its light weight, it can be put on the job soon after laying concrete. A dead-man control stops the machine from rotating the instant the operator lets go of the handle, but does not stop the engine. This is accomplished by a spring-loaded clutch which is actuated by a leaf spring, controlled by a lever in the handle.

The trowel has a Briggs and Stratton engine rated at 2.2 hp and has a knob on the handle so that the pitch of the blades can be adjusted to any degree while the machine is in motion. Further, the handle is adjustable so that the operator can set the height to the most comfortable position.

The guard ring is stationary for safety reasons and to allow the operator to work up to walls and other obstructions. The belt, also, is guarded for safety. A hook on the top of the engine is provided for lifting to upper stories of buildings.

The combination trowel blades can be used for both floating and finishing by adjusting the pitch control knob. Stow Co., 19 Shear St., Binghamton, N. Y.


1. Easy to smooth sealing rings into place
2. Easy to lower into trench
3. Easy to assemble
Install water lines faster to last longer
with Johns-Manville
TRANSITE®
PRESSURE PIPE
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Install Water lines *faster* to last longer...

New booklet shows how Transite Pressure Pipe provides speedy assembly, trouble-free performance

When you use Transite® Pressure Pipe with the Ring-Tite® Coupling you get the immediate benefit of fast and sure and thus lower cost—installation. And from then on its trouble-free performance continues to "pay off" through the years. That's why Transite is a natural first choice for dependable water mains . . . a first choice with engineers, municipal officials and contractors alike.

In a new 8-page illustrated booklet, you will find detailed information about Transite Pressure Pipe and about the Ring-Tite Coupling, that gives the ultimate in tightness in a pipe line that assures full, free flow of water under pressure. It shows why you can save assembly time every step of the way even in tough going . . . how fittings, valves and hydrants can be directly connected . . . why you get trouble-free, long-lasting service. Send coupon for your copy of this booklet today.

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TRANSITE PRESSURE PIPE
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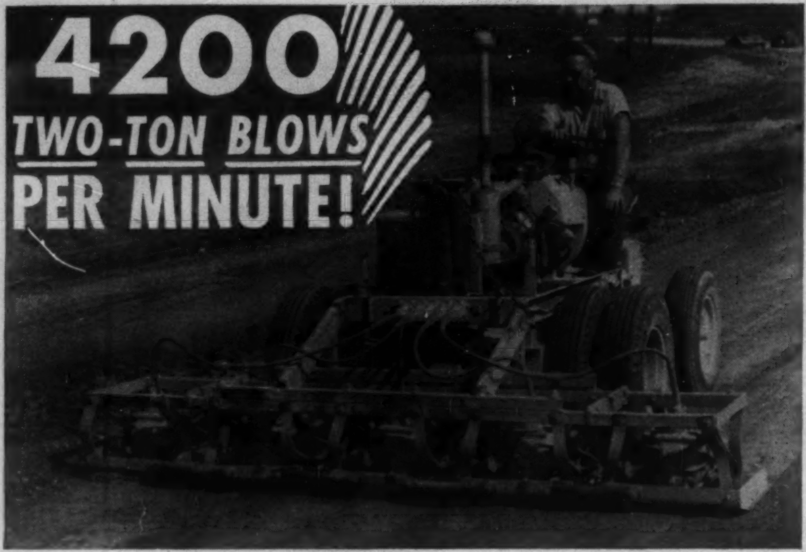
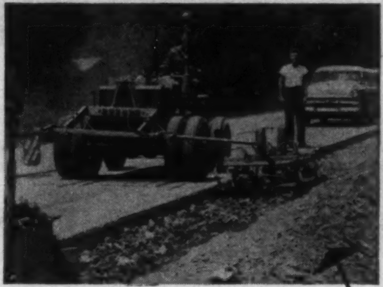


Here's TREMENDOUS COMPACTION

. . . for rapidly and most economically achieving or exceeding specified densities in the consolidation of rock, slag, soil-bound macadam, gravel and sand base courses. Only one pass of the Jackson Vibratory Multiple Compactor is usually required to thoroughly compact a full, standard course. Likewise, in rock and slag when sufficient fines are spread, all voids from top to bottom can be filled chock full with one pass of this machine. Standard width is 13′, 3″; working speeds: Up to 60′ per minute; reverse: Up to 5 MPH.

PAVEMENT WIDENING — LARGE AREA FILLS, ETC.

The Jackson Multiple is also the very finest equipment to be had for compacting the sub-base and base courses in pavement widening projects. By towing the compacting units at the side of the tractor, any granular material used for this purpose can be compacted to specified density in just one pass (compactor bases overlap). Large fills is another area in which this machine really shines. It's fast, thorough and very versatile; gets into places other machines can't reach. And for the really tight spots one or more of the compacting units may be detached, fitted with operating handle and used as a standard Jackson Manually Guided Compactor (self-propelling). By all means see this extremely advantageous equipment at your nearby Jackson distributor who has it both for rent and for sale. Distributor's name and literature on request.



The MULTIPLE on base course of a widening job 36" wide, 9" thick.
One of the compacting units fitted with operating handle and used individually.

JACKSON
VIBRATORS, INC.
LUDINGTON, MICH.

The other devices are the regular surface-mounted raintight type, and have a threaded hole in the top of the box to accommodate interchangeable raintight hubs for cable or conduit entrance. TRUMBULL COMPONENTS DEPT., GENERAL ELECTRIC CO., PLAINVILLE, CONN.

Narrow-Gage Locomotive Has 1,000-lb Drawbar Pull

A 2-ton diesel-powered locomotive, suitable for either 18 or 24 in. gage track has been designed for service where haulage demands do not exceed 1000 lb drawbar pull.

The engine is a Hercules 2 cyl, 4 cycle type rated at 30 hp at 1,800 rpm (sea level to 1500 ft elevation). Speed is controlled by engine throttle. Over-all dimensions are: height 47 in., length 88 in., width 39 in. MANCHA STORAGE BATTERY LOCOMOTIVE DIV., 4850 S. HALSTED ST., CHICAGO 9, ILL.

Lightweight Aluminum Pumps Require Little Manitenance

A new line of lightweight, all-aluminum pumps is being offered in four models—a 1½-in. model that pumps 6,000 gph, a 2-in. pump that delivers 8,000 gph and a 2-in. pump, with a larger impeller and greater engine power that has a capacity of 12,000 gph. Also available is a pump with 22,000 gph capacity.

According to the manufacturer, leakage is eliminated and the impeller requires little or no maintenance throughout normal use. MULTI-MATIC CORP., 14741 BESSEMER ST., VAN NUYS, CALIF.

Two-Foot Troffers Provide Clean Exterior Appearance

A new line of 2-ft wide troffers has been designed to provide a modern, trim ceiling effect. One of the features of the new troffer is that there are no catches, latches, hinges, screws or bolts visible to the eye.

Adaptable for installation in any type of ceiling designed for 24-in. troffers, this recessed lighting unit is supplied with or without integral trim flange. Further, a large selection of shielding media, from louvers and glass to plastic dish, is available. Louvers hinge from either side and can be completely removed without tools or loose parts. All glass and plastic shielding is completely enclosed in door frames, making it simple to remove for cleaning. SMITHCRAFT LIGHTING DIV., CHELSEA 50, MASS.

PUBLICATIONS

• Rubberized Paving—A 16-page illustrated brochure describes Rubarite, a new rubberized material produced specifically for use in asphalt and tar. Rubarite is made from a combination of unvulcanized synthetic rubber latex and minute particles of barytes, a chemically inert mineral.

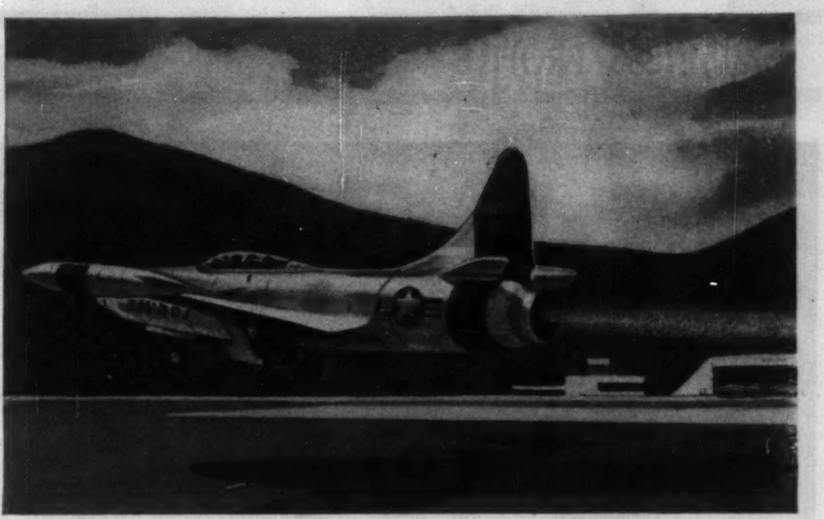
Three types of the rubberized material are being produced by the manufacturer. These include a paving grade for bituminous concrete, a mixing grade for rubberizing asphalt prior to its use and Rubarite jetlock for rubberizing tar for jet fuel resistant airfield surfaces. RUBARITE, INC, 141 W. JACHSON BLVD, CHICAGO 4, ILL.

• Movable Walls—"Space Control for School Buildings" is the title of a new folder which shows how movable walls are currently being used in schools and universities to cope with increasing enrollment, shifting curricula patterns, and changing educational techniques.

The folder features an installation in Dearborn, Mich.'s Edsel Ford Senior High School. Floor plans indicating the location of all partitions in the High School illustrate how they provide space control to meet fluctuations in enrollment. In addition to the basic theme of space control, the text describes the sound control advantages of the walls, their modern appearance, structural stability and other design and construction features. A list of the manufacturers' representatives is also included. THE MILLS CO., 956 WAYSIDE RD., CLEVELAND 10, OHIO.

• Prestressed Concrete—Just released are tables of loadings for LEAP prestressed concrete products. Included are double tee roof slabs, floor channels, bridge decks, piling and bleacher seats. LEAP, P. O. BOX 495, LAKELAND, FLA.

• Steel Windows—A 40-page catalog is available which describes steel windows for schools, hospitals, offices, institutional and public buildings. The catalog shows the manufacturer's complete line of windows including projected, awning, casement and combination windows. Tables of types and sizes, specifications, installation details, section details and information on uses, construction, hardware, screening and galvanizing are all covered. Numerous photos show typical installations. FENESTRA ARCHITECTURAL DIV, DETROIT STEEL PRODUCTS CO, 3159 GRIFFIN ST, DETROIT 11, MICH.



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FLINTBINDER* C-2 . . . a specially compounded hot-mix tar-rubber binder for jet fuel resistant flexible pavement. Used as surface course or overlay on asphaltic or portland cement concrete. (Meets Corps of Engr.'s specification for tar-rubber binder).

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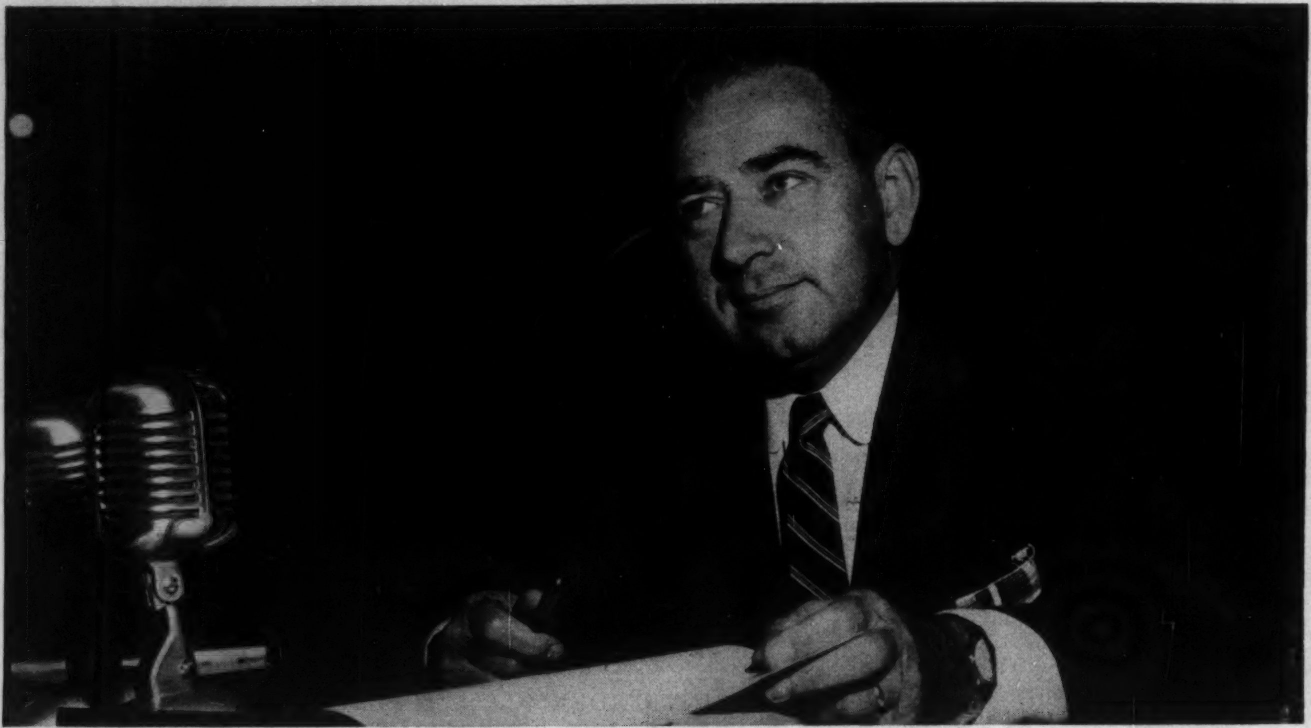


"FLAT TOP" SMITH—this year's colorful NAHB president, heads an organization which builds 80% of U. S. homes.

NAHB grows bigger, develops more services, so . . .

Home Builders Move Into New Headquarters

J. P. Chamberlain
Associate Editor

This week, the biggest organization in the construction industry opened up a fancy new Washington headquarters. It's the National Association of Home Builders' Housing Center, an eight-story structure of brick, granite, and glass located a few blocks from the White House.

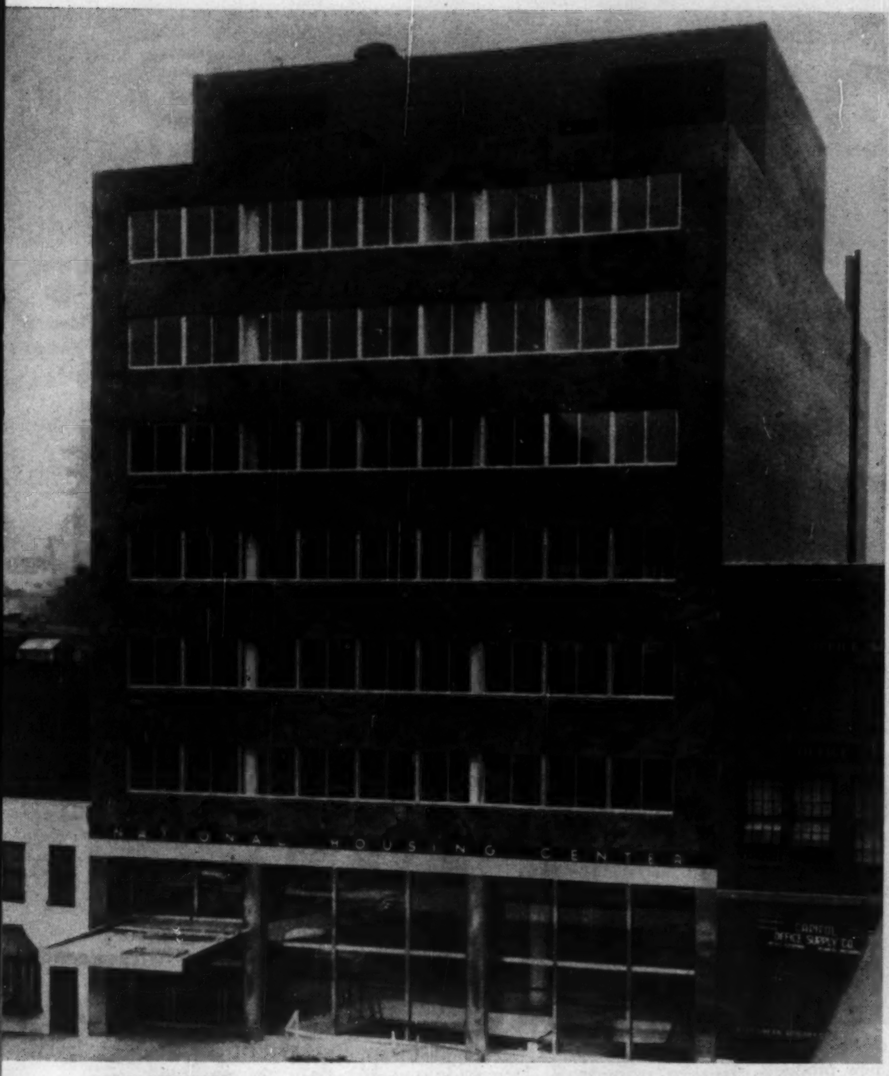
In a way, the National Housing Center symbolizes a change that has gradually taken place in NAHB during the past few years. At first, it was a powerful lobby; now it is also a service organization for homebuilders.

As of now, for instance, NAHB has a Research Institute working on specific projects to help home builders, such as the Air-Conditioned Village in Austin, Texas, and the Gypsum Village in Chicago. Its Construction Department works with builders on field problems, and with FHA and VA on regulations covering new designs. It has encouraged members to swap their trade secrets with each other. It conducts mortgage clinics, and gives short courses on business management. It is working on revision of building codes, and on slum rehabilitation. It gives advice on labor problems, studies business trends, and is working to fill the many gaps in housing statistics.

This emphasis on service activities is shown by the floor layout of the Center. The two top floors are office space for NAHB, and the other six floors are exhibit space for manufacturers of materials and equipment. There is some free exhibit space for new products. The exhibits are for the general public, as well as for builders and architects.

• A single showcase – When the Housing Center was first planned five years ago, the original idea was to provide more office space for the expanding NAHB staff. Then some members, who had seen the Netherlands' Bouwcentrum in Rotterdam, suggested that the original plan be expanded to bring together in one showcase the ideas, materials, and technical information that would enable builders, architects, and home buyers to pick the best available components and designs for whatever they might have in mind.

EXECUTIVE DIRECTOR John Dickerman started as contact man with Congress.



THE CENTER—located a few blocks from the White House, NAHB's National Housing Center is planned as showcase of ideas, materials, and technical information.

To carry this out, NAHB is assembling a comprehensive reference library, plans a series of special exhibits, and a continuing series of seminars on the various aspects of home building. The Center has an auditorium for 250 people, plus seminar rooms for smaller groups.

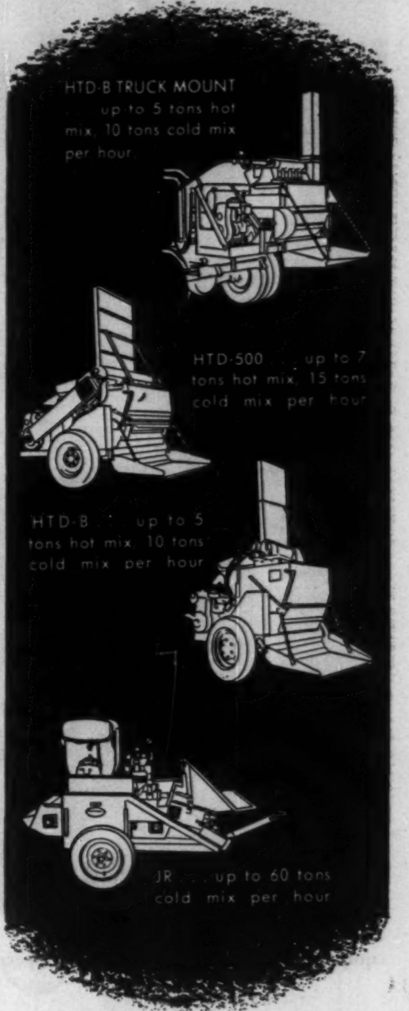
• **How it began**—This modern headquarters is a long way from the beginning of NAHB in 1942, out of the home builders division of the National Association of Real Estate Boards. Members of that parent division had been active in framing the legislation that set up the federal savings & loan system, and later the Federal Housing Administration. These new institutions, of course, have had a lot to do with the postwar housing boom.

By 1940, however, it had become clear that an organization separate from NAREB would have a broader attraction for builders. In 1942 the Home Builders Institute got complete autonomy from NAREB. Several months before, it had set up an Emergency Committee to stop the government from shutting off private home building completely during World War II. For the first time, there was a very obvious need for a national organization. In fact, a group of anti-NAREB builders had already formed a separate National Home Builders Association.

• **War problems**—In late October of 1942, while negotiations were going forward to merge the two groups in an organization independent of NAREB, the War Production Board suddenly shut off private priorities for war housing. The Emergency Committee was meeting in Washington at that moment; and it acted so

(Continued on page 58)

McConnaughay
ASPHALT MIXERS


HTD-B TRUCK MOUNT . . . up to 5 tons hot mix, 10 tons cold mix per hour.
HTD-500 . . . up to 7 tons hot mix, 15 tons cold mix per hour
HTD-B . . . up to 5 tons hot mix, 10 tons cold mix per hour
JR . . . up to 60 tons cold mix per hour

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Designed for economy of operation and fast production, the McConnaughay line of Asphalt Mixers meets every need for most resurfacing as well as all types of pavement patching. Working on location, McConnaughay HTD Mixers provide the *exact amounts* of materials needed and effectively remove both moisture and solvents from bituminous mixtures . . . positive assurance that patches and resurfaced areas will set up hard. For details and specifications on the mixers above and on the JR and HTD-LP models (not illustrated), write, wire or 'phone . . .

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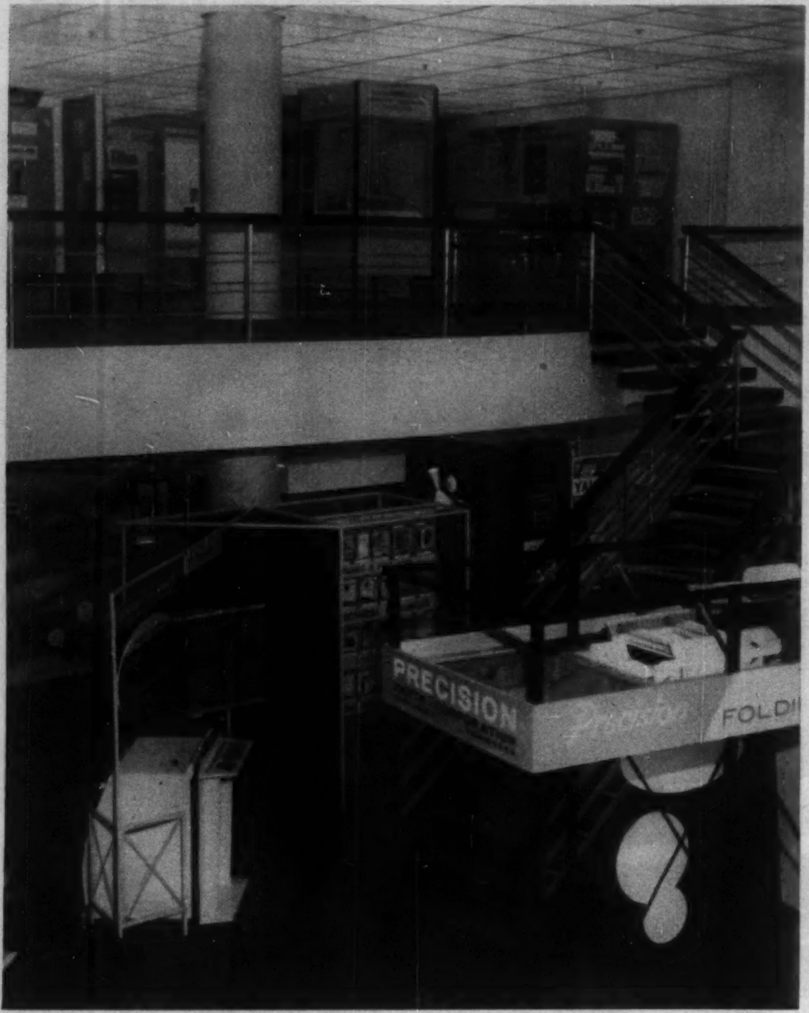

SIX FLOORS OF EXHIBITS. Most of the center is exhibit space for materials and equipment. There will be some free space for new products.

. . . They Needed a National Group

effectively that WPB's order was rescinded five days later.

By this time the Home Builders Institute had already incorporated itself under the new name of National Association of Home Builders. NAHB and the National Home Builders Association merged some months later, in mid-1943. The merged group started out with about 1,300 members and with Frank Cortright, who had been executive secretary of the old Emergency Committee, as executive vice-president.

• **Postwar growth**—Though building was not at boom levels during the war, more and more people in the industry began to realize what a national organization meant to them. By V-J Day, NAHB had about 8,000 members. In the years since, as building zoomed, membership has climbed steadily to the present total of 33,000. About half of these are builders, who handle about 80% of non-farm home-building. The other half are associate members, connected closely with the industry as suppliers, subcontractors, mortgage men, and others. And any observer of home-building in the postwar years can testify that the national organization has done a good job of getting government support for a high level of home starts.

• **Structure** – NAHB is based, of course, on its state and local affiliated organizations, which are largely autonomous and have their own dues setups. There are organizations in 43 states—about 230 of them. There are also about 500 builder-members at large, who operate in areas where there are no state or local groups.

The associations elect national directors on the basis of membership—about 400, with an equal number of alternates. These directors take office at NAHB's annual convention each January in Chicago, when they elect the national officers. Most of the members also show up at the annual convention—about 25,000 of them this year. But that's only the start of the meetings an active member attends. Says one of NAHB's staff: "It's the meetingest association there is."

• **Meetings**—Besides the annual convention, the full board of directors have spring and fall meetings to decide on policy. And if they are active on one of the 22 directors' committees, they have occasional committee meetings. Most of the committees have a direct connection with one of the departments of the permanent staff.

Also, in addition to the state and local meetings, there are several regional meetings each year. At these meetings, NAHB staff and qualified members conduct mortgage clinics, give help on technical problems, conduct courses on business management, and aid with local builders' programs.

• **Core**—The center of NAHB, of course, is its officers, executive committee, and permanent staff. Officers—president, two vice presidents, treasurer, and secretary—take office at the end of the January convention. Along with the outgoing president, and 11 members appointed by the new president, they form the executive committee. Frank Cortright, who retired as executive director in 1953, and Nathan Manilow, a past president, are honorary members.

Because the board of directors is so large, the executive committee has considerable influence as a steering group. It usually has about three interim meetings a year to make plans for the directors' meetings, and to decide immediate problems. At the three meetings of the full board of directors, the various directors' committees submit recommendations in their special fields to the full board. Regional vice-presidents for each of 20 regions keep the national organization's field services in touch with the needs of the state and local groups.

• **Earl Smith**—The "meetingest" man in NAHB is of course its president, who this year happens to be Earl Smith, the California builder who's usually called "Flat Top" because of

(*Continued on page 62*)

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...to a one-piece
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If you think steel buildings are all alike—we suggest you examine a Butler steel building. A Butler has the good looks and weather-proof permanence for stores and office—at a cost low enough for warehouses! Precision manufacture makes the *big* difference. Every cover panel is die-formed—not hacked out of standard corrugated sheets. That means one-piece corners, one-piece roof ridge, rigid curved eaves, mitered wall-roof joints, weathersealed windows, doors and foundation joints.

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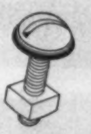
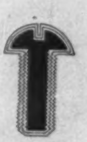


Every bolt has a life-time cushion. Neoprene washers cushion bolts—last indefinitely. Give and take with temperature changes—keep every panel sealed weathertight!



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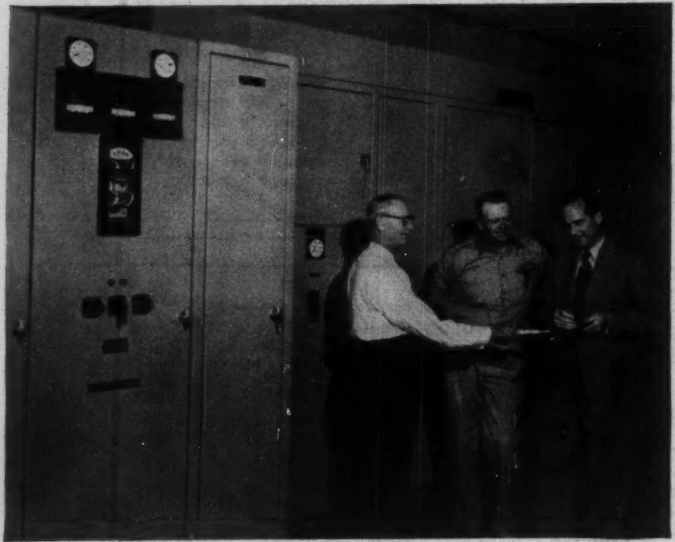
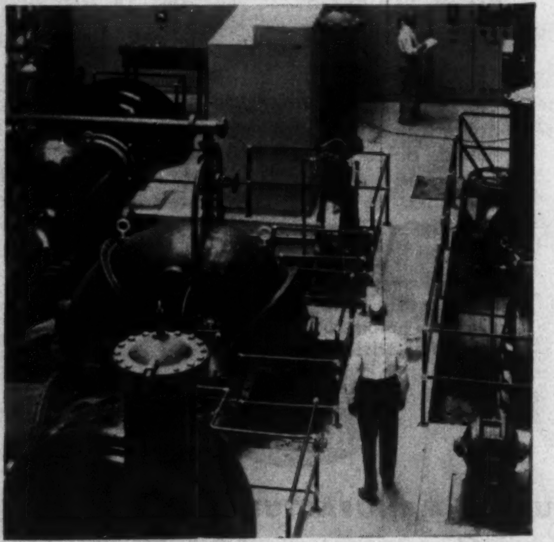
ENGINEERING REPORTS:

MILLIONS OF DOLLARS worth of crops in Reclamation District 108 depend on reliability of G-E pump drives and controls for vital irrigation. Aerial view shows Riggs Ranch automatic pumping station, one of several serving district.



RELIABILITY of G-E metal-clad switchgear and Limitamp control helps assure continuity of service at El Dorado station. Harold Wood, consulting engineer; Kenneth Brown, District 108 manager (l-r) planned installation with L. S. Barry, G-E Sales Manager.



42 YEARS OF SERVICE is the outstanding record of five General Electric 650-hp motors, several of which are visible above, in Rough and Ready pumping station. Limitamp control in background was added in 1949.

58,000-acre irrigation project proves performance, reliability of G-E equipment and service

Dependability of G-E equipment and service "could not be better" says Kenneth R. Brown, manager of Reclamation District 108 of Calif.

Reclamation District 108, a co-operative of individual farmers in Colusa and Yolo counties of California, electrified its irrigation pumping system half a century ago. It has been General Electric's privilege to provide most of the electrical equipment for this model project over the years.

"We can count on G.E.—we've learned that from experience," say Blackie and Wood, consulting engineers of San Francisco, who specify G.E. 100 per cent in expansion and modernization of the District's system. And manager Brown adds, "Both the products and the service we get from G-E Sales and Service Shop people could not be better."

Proved in service at the several pumping stations on the Sacramento River which comprise District 108 are 55 G-E pump motors from 25 to 650 hp, and many units of G-E control. Built for long operating life, G-E Tri-Clad* motors at automatic pumping stations require little or no maintenance. G-E Cabinetrol* and Limitamp* control panels help protect circuits, give centralized motor control, are custom-assembled from pre-engineered components to save engineering and installation time at the site.

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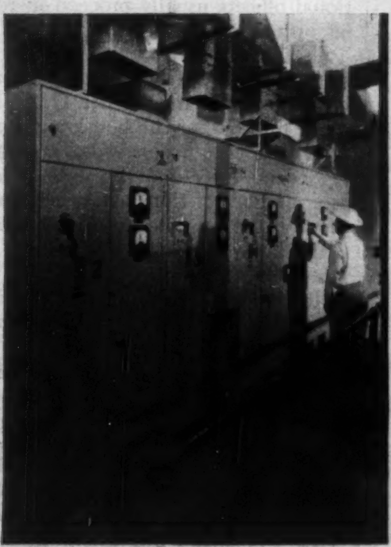
MINIMUM MAINTENANCE has been needed by this G-E 100-hp vertical pump motor over many years of service at the Boyer Bend automatic pumping station.



FACTORY ASSEMBLED to save installation time, this G-E Cabinetrol assembly controls five G-E synchronous motors at the Wilkins Slough pumping station.

HIGH DEPENDABILITY is typified by this G-E motor, one of three, slant-connected to pumps on riverbank, which have operated five years with no outage.

his characteristic low-cost contemporary home style. Like the presidents before him, Smith finds he is spending half or more of his time on NAHB business, shuttling between his home in El Cerrito, Washington, New York, and other big cities. By the end of the year, he will have spoken several times in most of the 20 regions. Many of the other officers and committee chairmen also spend a sizeable amount of time with NAHB affairs.

• **Why do they?**—Its an interesting question why Smith and other NAHB officers—or the leaders of any big trade association—are willing to spend so much time away from their own business affairs. Probably the best answer is that they enjoy the recognition that they have reached the top in their profession.

Smith is one of the biggest builders in the U. S., one of the few men in the industry known to a wide public. He is an unusual character even in a business that's full of individualists. For one thing, his father, grandfather, and great-grandfather were builders before him. He went to work for his father at 14 as a full-time carpenter, and studied drafting. For a while, he was a professional actor on the side. In his earlier days as a builder, he frequently did some of the carpentry on his houses, and still does his own design.

• **Broke the succession**—Earl Smith's election last January broke the regular line of succession by which the national officers usually proceed in regular order to the top spot. His "Shop Talk" sessions on construction technique at national conventions and local meetings around the U. S. had made him one of the best-known men in NAHB. He had served as chairman of several directors' committees, and as a member of the executive committee. At the time he was elected president, he was board chairman of the Research Institute.

It is natural that with a new president each year, organization policy will change somewhat to reflect his major interests. Smith, for instance, is primarily interested in the technical aspects of construction. Dick Hughes, the 1954 president, devoted himself largely to federal legislation and the mortgage market, as did Manny Spiegel, his 1953 predecessor. In 1952, Alan Brockbank had spent much of his time attending to the business of promoting slum clearance.

Both before and during his presidency, Smith has probably done more than any other individual in the industry to focus builders' attention on the problem of community facilities—schools, sewers, water, drainage, roads, and recreation areas. Smith views this problem as the toughest now facing home builders. But he feels they should solve it in co-operation with local communities.

"We builders will cooperate to the utmost," he said recently, "so that communities can intelligently set about planning and accomplishing the comprehensive programs required to meet the immediate and long-range needs of their citizens."

• **Chief of staff**—An important factor in maintaining continuity of NAHB's many activities is NAHB's 41-year-old executive director, John M. Dickerman. He started in 1947 as legislative director, keeping the industry in touch with Congress and the executive agencies that have to do with housing. Before that, he had been Washington representative and general counsel of the Air Line Pilots Association. In 1953, Dickerman took over as executive director on Frank Cortright's retirement.

When Dickerman started in 1947 at NAHB, in addition to legislative contacts, he also had under his wing mortgage finance, slum clearance, and housing economics. Since then these sidelines have blossomed out into separate activities, with full-time directors of their own. Early in 1953, a separate department was set up for slum clearance and neighborhood improvement. A separate education department was set up in the same year to provide civic and social groups (as well as local NAHB associations) with program ideas, pamphlets, visual aids and other services. The mortgage finance and economics departments were established last year.

• **Growing**—These activities are expanding as NAHB membership grows. Dickerman predicts that membership may reach 50,000 by the end of the 1950's. And he says he wouldn't be surprised if the industry were building 2,000,000 homes a year by the late 1960's, when the babies of the post-World War II boom start setting up homes of their own. He's confident that the industry is bound to keep growing.

"We're in the enviable position," he says, "of finding that this growth is good for the country while at the same time being good for our industry."

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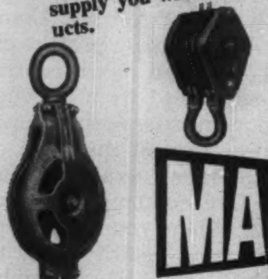

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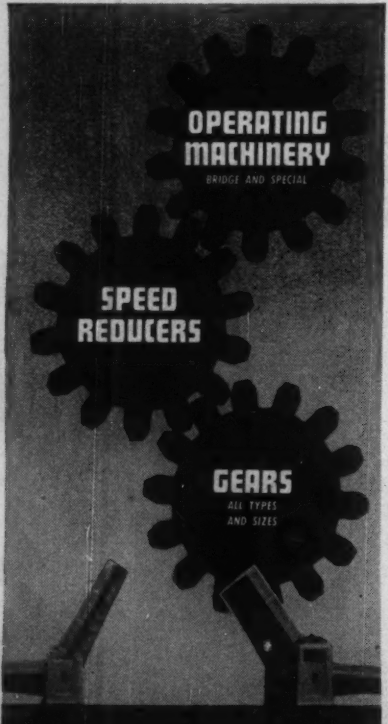

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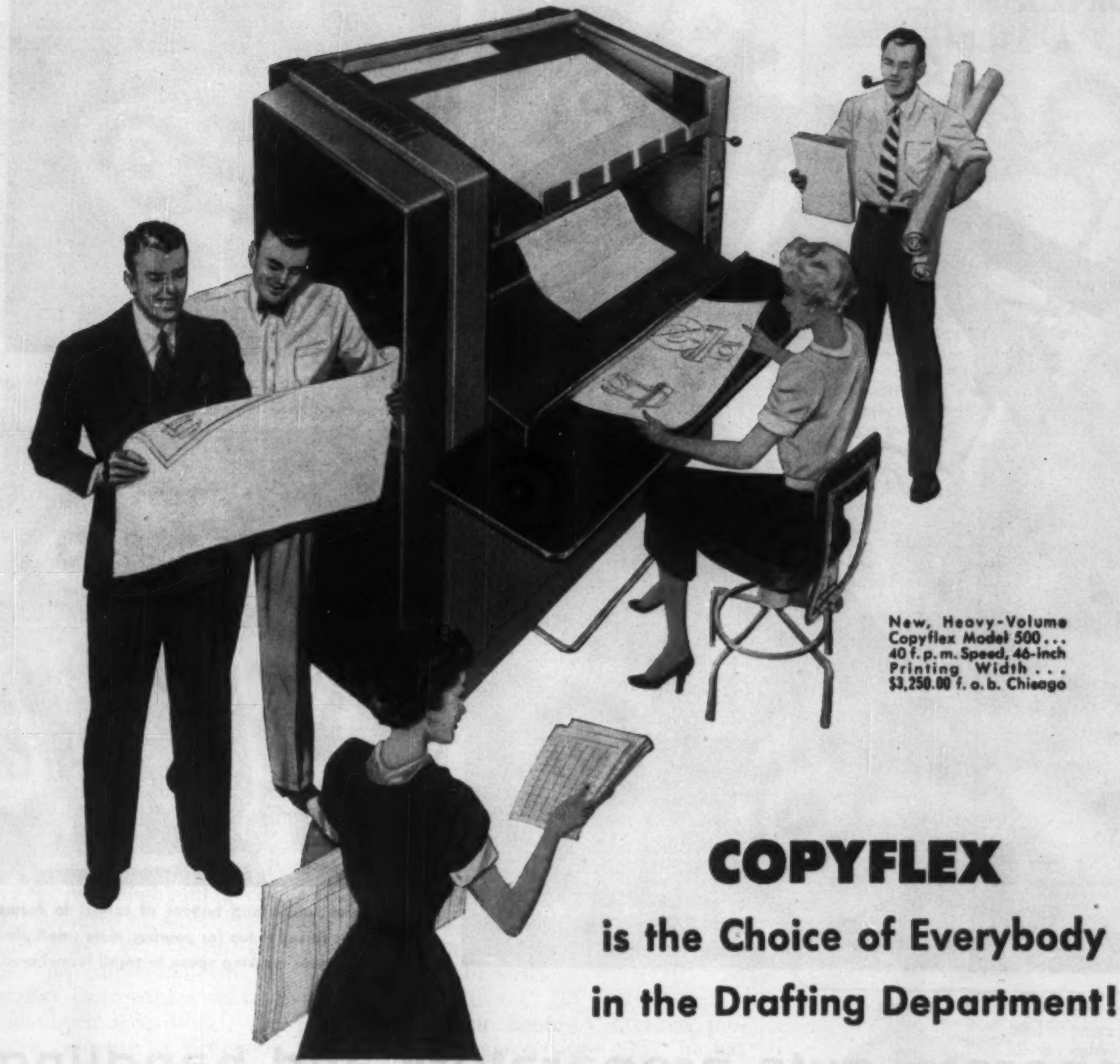

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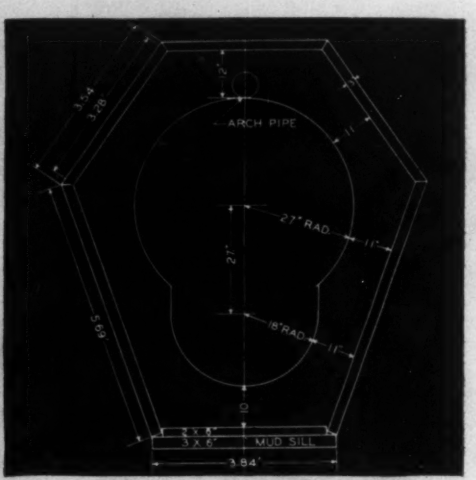
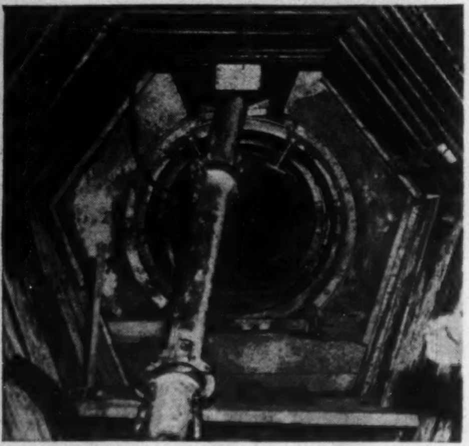


Here you see a cross section of the tunnel showing construction and measurement details.



Pipeline was laid along bottom of tunnel to forms where it was raised to top for pouring. Note small pipe allows maximum working space in small tunnel area.

Pumpcrete® cuts preparatory and handling costs on Milwaukee sewage tunnel

Above you see the entrance shaft to a 3300-foot concrete tunnel being constructed for the Milwaukee Sewerage Commission by J. W. Lazynski, Inc., Milwaukee contractor. The concrete for this tunnel was placed by Pumpcrete, the pump that pumps concrete by pipeline.

This is how it was done:

The Pumpcrete machine, a Model 160 Single, was located on the surface near the entrance shaft where it was charged by truck mixers. The pipeline was directed down the entrance shaft and along the tunnel bottom to the forms where it was raised to the crown through 45° bends. The 27" radius tunnel was poured in 60-foot sections and required about one cubic yard of concrete per linear foot.

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MEN AND JOBS

G. W. Martin: 20 years at Green Bay earns . . .

Recognition as FSIWA's 16th President

Installation as 16th president of the Federation of Sewerage and Industrial Wastes Associations at its 28th annual meeting in Atlantic City next week will highlight a career of almost 30 years in sanitary engineering for George W. Martin, chief engineer and superintendent of the Green Bay metropolitan sewerage district in Green Bay, Wis.

Martin, a native of Wisconsin, was hired for his Green Bay job in 1935 and has spent the subsequent two decades as energetic guardian of the city's sewerage and treatment facilities.

He was educated at the University of Wisconsin from which he received a BS (1926) and a civil engineering degree (1935). Until he came to Green Bay, he was employed by private firms on paving, sewers, sewage treatment plants and water works installations, as resident engineer and later as design engineer.

• **Expansion** – Thoroughly familiar with the sewerage facilities of the city as a result of his earlier affiliation with Jerry Donohue Engineering Co., which had designed nearly half of the Green Bay system, Martin has chalked up these accomplishments: Doubling the mileage of intercepting sewers, doubling the capacity of the primary treatment plant and quadrupling the sludge digestion capacity.

His district recently completed construction of a new intermediate sewage treatment plant equipped with high-rate filters.

From 1937 to 1952, Martin also served as a member of the Green Bay water commission and was its president for 14 years.

• **A familiar figure**–A licensed professional engineer since 1932, he has been active in engineering association work, and during the past 15 years has held directorships in the Wisconsin Society of Professional Engineers, the FSIWA (of which he's now vice president) and the National Society of Professional Engineers.

He has been president of the Conference of Wisconsin Sewerage Works Operators, the Central States Sewage and Industrial Wastes Associations, Wisconsin Society of Professional Engineers and the Green Bay Engineers' Club.

Martin is a familiar figure on the dais of Central States Conference meetings and has written and published a number of technical articles. He has received both the Kenneth Allen and William Hatfield awards for his achievement in the field of sanitation.

At the Oct. 10-13 Atlantic City meeting subjects will range from "Acid Mine Drainage Problems" to "The Use of Radioactive Isotopes in Deter-

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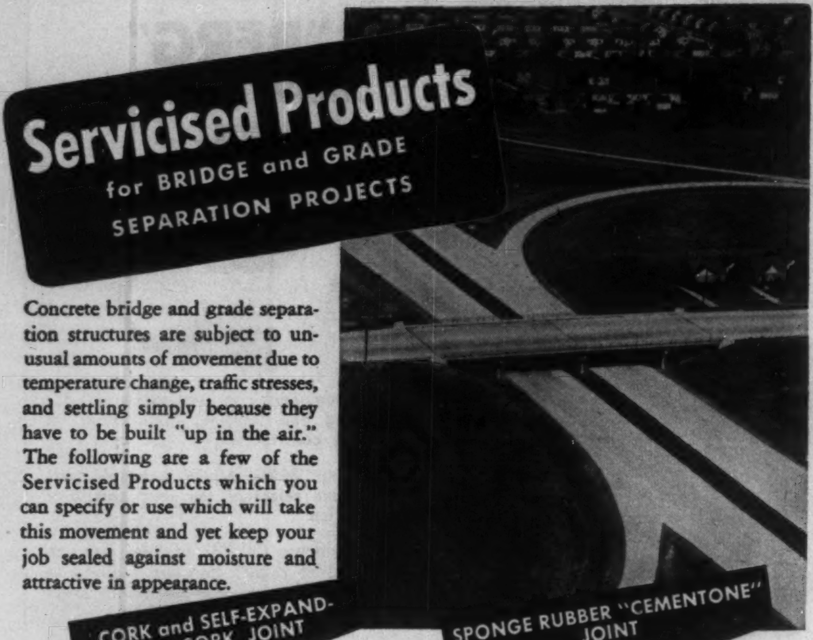

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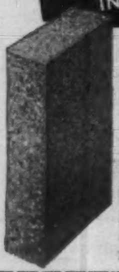
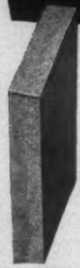


Both types are non-extruding resilient and compressible, inconspicuous in color. Cork recovers 95% original thickness after compression; Self-Expanding Cork is treated to expand 50% beyond original thickness to keep joint filled regardless of contraction movement.

SPONGE RUBBER "CEMENTONE" JOINT FILLER



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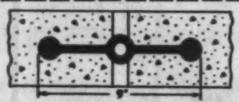

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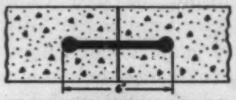

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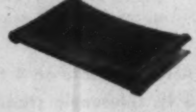

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mining Flow Patterns in Lagoons," and from "Thru-way Sewage Treatment Plants" to an "Open Discussion of Sewage and Industrial Waste Research."

Culbertson Appointed To Post in Wisconsin

Ralph D. Culbertson of Madison, Wis., has been appointed chief engineer for the state of Wisconsin. He was named by Gov. Walter Kohler to succeed Charles A. Halbert, who has retired.

Halbert had been in state service for nearly half a century and had served as chief engineer for the last 28 years. In addition to supervising the design and construction of over $100 million dollars worth of state buildings, he has also had charge of building maintenance.

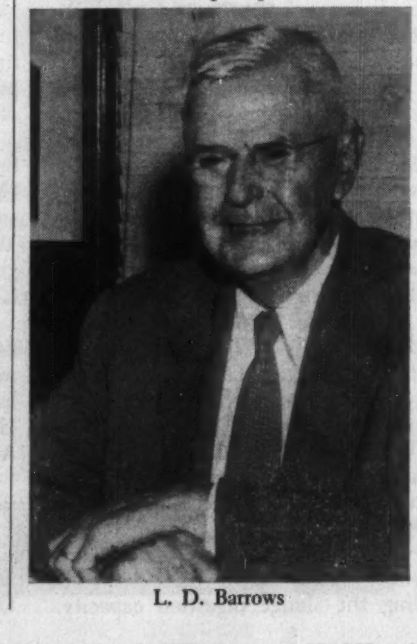
The new chief engineer is a civil engineering graduate of the University of Wisconsin and was formerly division engineer for Chicago & North Western Railway.

Lucius D. Barrows Retires From Maine Highway Post

Lucius D. Barrows, chief engineer of the Maine State Highway Department, retired last month, after 45 years of service to the state. His successor is Vaughan M. Daggett, former assistant chief engineer.

Barrows graduated from the University of Maine in 1907 and worked for the Federal Bureau of Public Roads before joining what was then the roads department of the state. He was appointed chief engineer in 1928.

A member and past president of the



L. D. Barrows

Association of Highway Officials of the North Atlantic States, Barrows is secretary of the Maine Good Roads Association, secretary and treasurer of the Maine Turnpike Authority, chairman of the Board of Registration of Professional Engineers and president of the Maine chapter of ASCE.

Daggett, the new chief engineer, joined the highway department in 1930 and had served as assistant chief engineer since 1951.

M. J. Kahula Appointed To State Housing Post

Michael J. Kahula of Brooklyn, N. Y., has been appointed chief construction adviser to the New York State Division of Housing.

He will coordinate the supervision of housing project construction in New York City financed by the state's $935-million slum clearance and low rent housing loan fund, as well as housing developments to be built by private housing companies under terms of the new state limited profit housing law.

For the last seven of his 25 years in construction work, Kahula has been superintendent of construction for the New York City Housing Authority in charge of state-aided housing projects.

Named Highway Consultant

President Eisenhower has appointed Henry W. Osborne, traffic engineer for the City of Buffalo, N. Y., as federal consultant on highways. A native of Litchfield, Conn., Osborne has been granted a year's leave of absence from his work at Buffalo and assumed his new duties on Sept. 30.

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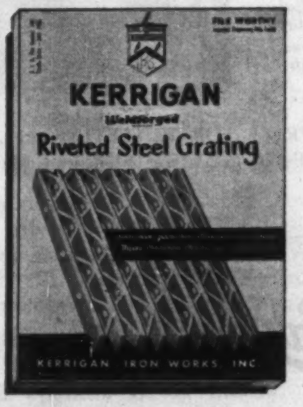
for the 1001 applications where safety and strength come first. Kerrigan Steel Grating is BONDERIZED for corrosion resistance and extra years of life.

STAINLESS and MONEL
non-magnetic steel for the chemical, oil and packing industries . . . for ANY installation where high resistance to heat, acids, chemicals, and corrosion is needed.

TRULY . . .
In both size and type, there is a Kerrigan Weldforged grating for every need. Let our new catalogs prove it to you. Send for the one you think best answers your need (or ask for ALL FOUR if you wish). We will also be glad to send you a desk-size grating sample. Write Kerrigan Iron Works, Inc., General Sales Office, 274 Madison Ave., New York City.


FILE WORTHY
KERRIGAN
Weldforged
Riveted Steel Grating
KERRIGAN IRON WORKS, INC

RIVETED STEEL
where it is desired to match existing grating.

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Weldforged
RIVETED
ALUMINUM
SPARK-PROOF
Floor Grating and Stair Treads
KERRIGAN IRON WORKS, INC

ALUMINUM
spark-proof for those whose need is strength AND lightness. Extra safe and strong. Allowable fiber stress 15,000 psi. Modulus of elasticity 10,000,000 psi.

KERRIGAN GRATING
CUSTOM-MADE FOR YOUR JOB AND SAFE—IT'S *Weldforged*

How "BUFFALO" Can Help You
with your
AIR CLEANING Jobs

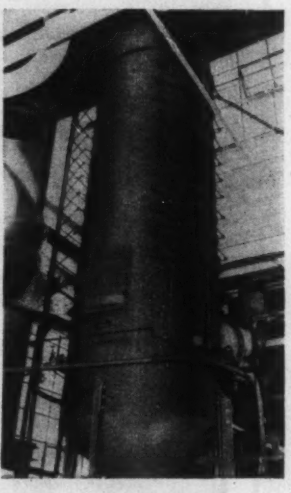
With the country becoming more and more pollution-conscious, industry calls on Engineers with many "puzzlers" in the way of air-cleaning problems. Here at "Buffalo", with over half a century of experience in this field — and a wide line of equipment — we are in an excellent position to help. Our files include a tremendous variety of problems successfully solved, with new information being added almost daily. "Buffalo" Engineers are constantly developing highly specialized equipment for new and specialized problems.

EXAMPLE — a collection efficiency of 99.9% plus, ending a serious nuisance problem in phosphate rock drying operations.

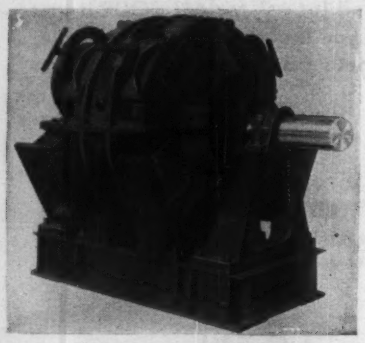
EXAMPLE — 1000° F. highly corrosive gas effluent made nuisance-free and non-toxic.

EXAMPLE — tar vapor, lampblack, metallic fume in concentrates of 5 to 10 grains cu. ft. removed to average of .006 grains per cu. ft. in numerous installations.

"Buffalo" equipment includes Air Washers, Hydraulic Scrubbing Towers, Hydro-Volute Scrubbers, Rotary Multi-stage Gas Scrubbers, Gas Absorbers, Blowers, Exhausters and Pumps to solve most any cleaning problem you may have — all engineered to the job, for highest efficiency and simplest possible maintenance. Call on the "Buffalo" Air Engineer in any principal city for sound, helpful recommendations.



"Buffalo" Hydraulic Scrubbing Tower



"Buffalo" Rotary Gas Scrubber

WRITE FOR BULLETINS AP-225, AP-425, AP-525, 3181-B, and 2424-F.

"Buffalo"
Air Cleaning
Equipment

"Buffalo"
SALES ENGINEER
AIR CLEANING
BUFFALO FORGE COMPANY
163 MORTIMER STREET BUFFALO, N. Y.
PUBLISHERS OF
"FAN ENGINEERING" HANDBOOK
Canadian Blower & Forge Co., Ltd.
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Sales Representatives in all Principal Cities

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Men and Jobs Briefs . . .

• **Associations**—At its first regular meeting, the Tri-State Structural Steel Fabricators Association, embracing Pennsylvania, Ohio, and West Virginia, elects **O. E. Guibert** (Guibert Steel Co., Pittsburgh) as president . . . **Roger H. Corbetta,** president of Corbetta Construction Co., Inc., is reelected chairman of the Concrete Industry Board, Inc. of New York City.

The Kentucky-Tennessee sections of the American Waterworks and the Industrial Waste and Sewage Works Associations name new presidents: **Justin J. Davis** of Memphis succeeds **J. Stephen Watkins** as AWWA head and **Charles M. Davidson** of Chattanooga takes over from **Robert J. Johnson** in IW&SWA.

• **Corps of Engineers**—In a recess appointment, President Eisenhower appoints **Col. John L. Person,** division engineer in Cincinnati, a member of the Mississippi River Commission, succeeding **Maj. Gen. Charles G. Holle . . . Sam D. Burks,** with the corps for 16 years and last assigned as assistant project engineer on Folsom Dam in California, joins the Dewey and Almy Chemical Co., division of W. R. Grace & Co., to direct sales of construction specialties products to the concrete industry.

Reassignments within the Vicksburg, Miss., district, resulting from a shift in construction activities, include: transfer of **R. M. Hamberlin,** Monroe assistant area engineer, to the Greenwood area office as superintendent of construction and maintenance, succeeding **George Hammitt,** who moves up to Grenada, Miss., Dam as resident superintendent. Hammitt replaces **John D. House,** who goes to Enid, Miss., Dam as resident superintendent, succeeding **Jesse C. Shanks,** who goes to Vidalia as area inspector.

• **Careers**—Executive director **L. E. Ordelheide** resigns from the Metropolitan St. Louis Sewer District of St. Louis and St. Louis County, Mo. and is succeeded by **Clifford Mitchell,** former director of sanitation in the St. Louis County Health Department . . . **Harry Glisch,** former deputy building inspector, is appointed Milwaukee building inspector, filling the vacancy left by retirement of **Leon M. Gurda.**

George L. Ramsey is named city

Five to 6 passes by the $1\frac{3}{4}$-yd. shovel fill Rear-Dump to heaped capacity. In making change-over from scraper to rear-dump, same tires, wheels, brakes, and controls are used.

Alabama contractor shows how to get "double value" from each dollar of equipment investment

"Interchangeability" has a powerful meaning to Clyde O. Mitchell, Birmingham. It's the way he assures himself "double value" from his versatile C Tournapulls.

For dirtmoving, Mitchell hitches 14-yd. scrapers behind his 2-wheel "C" prime-movers. Whenever he encounters shovel rock, he switches scraper bodies for rear-dumps to handle this problem. The ability to switch to rear-dumps eliminates added ownership or rental expense of trucks, reduces maintenance cost as well as equipment and parts inventory, and permits operation under weather and haul road conditions that would shut down truck operation.

Double duty means added profits

Mitchell has made extra profits twice so far on important jobs because of this quick-change feature of his C Tournapulls.

First double-duty assignment was a state highway improvement job at Decatur, Alabama. On this job, the scrapers handled 800,000 yds. of dirt, while Rear-Dumps moved 100,000 yds. of rock.

Recently he relocated and straightened 4.1 miles of State Highway 431 between Attalla and Boaz. Here, of the 486,000 cu. yds. of material to be moved, about 16% was rock, 75% chert, and 9% clay. The dirtmoving was handled by two C Tournapulls with Scraper, three 18-yd. tractor-drawn FP scrapers, and three self-propelled scrapers of another make. The Tournapulls were then equipped with Rear-Dumps to haul rock . . . about 78,000 yards.

4200′ cycle every 6 minutes

Time studies show the Tournapull Rear-Dumps are real producers. With wide, easily entered bodies, they were loaded with 10 pay yards by a $1\frac{3}{4}$-yd. Lorain shovel in an average of 1 minute, 40 seconds. Working 4200′ cycles, each round-trip took only 6 minutes. Haul and return speeds averaged 12 mph. Hourly output for the 2 machines was 180 pay yards per 55-minute hour.

More speed on long hauls

This kind of production and Tournapull interchangeability highly pleases the owners. Says Supt. G. M. Wakefield: "I like the C Tournapull prime-mover. It's got a good scraper and rear-dump. It will stand up against any dirtmover."

Adds operator C. L. Moore: "The Tournapull can turn everywhere, and it's got more speed on long hauls. It's simple to understand . . . easier to operate than other rigs."

Figure out for yourself on the basis of cost alone the extra value of Tournapull interchangeability. An additional haul unit costs about 25% of the total initial price of prime-mover and original haul-unit combination. Interchangeable haul-units can be purchased at any time.

Find out how this double-duty equipment can give *you* double earning power for every dollar of investment. For more facts and owner-verified case histories, write or phone today.

Dumping on the run, Rear-Dump builds subgrade in cut where rock has been removed. Average dumping time was about 20 seconds. Electric controls respond instantly for steering and controlled dumping.

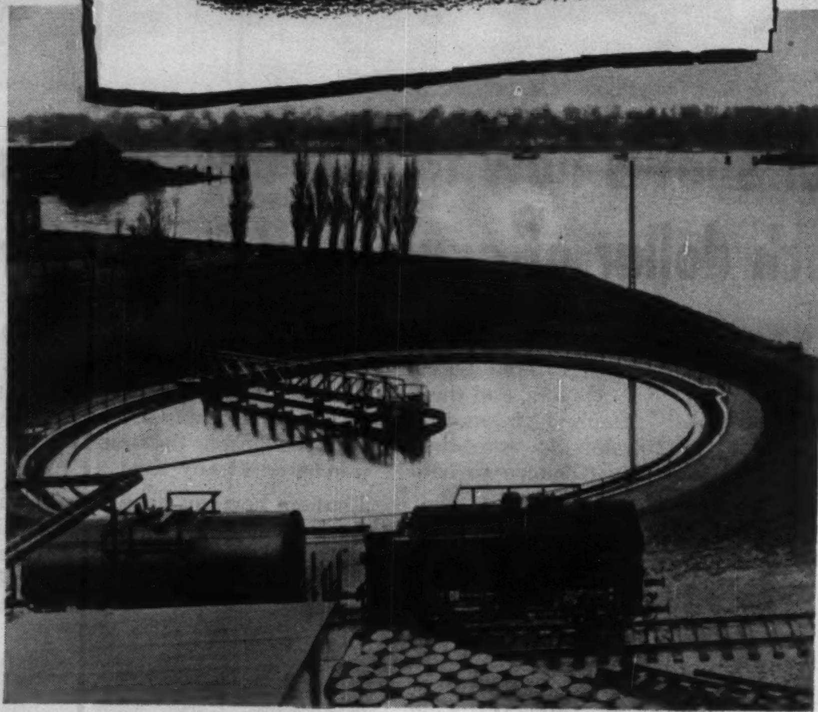
Tournapull—Trademark Reg. U.S. Pat. Off. R-801-H-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Oil Refinery Waste Treatment in Germany



In Germany too, stream pollution by industrial wastes causes serious problems. A large refinery in Hamburg solved the problem with the installation above. Showing a marked similarity to current practice in the United States, the plant employs a 110′ dia. Dorr Clarifier equipped with a skimming arm as the main treatment unit.

Feed to the unit is 6600 GPM of refining waste, and an effluent is produced containing less than 20 ppm of oil, well under the limits required by the authorities. Equipment was supplied by our Associated Company in Germany, Dorr-Oliver G.m.b.H.

If you have a problem involving the separation of finely divided solids in suspension . . . or ion-exchange . . . or the use of fluidizing techniques, there's a good chance that Dorr-Oliver and its world-wide organization can help you.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

MEN AND JOBS

building commissioner of Chicago, succeeding **Richard Smykal,** who was appointed commissioner of the new Community Conservation Board . . . **John Irvin Church,** who's been with the North Carolina Highway Department for 19 years, becomes district highway engineer for Cleveland, Gaston and Lincoln counties.

- **Business**—The Green Engineering Company, structural engineers in Sewickley, Pa., names **Julian A. Vrydagh** as chief draftsman, and **George Ono**, active for the last 14 years in industrial, institutional and commercial electrical distribution, power, controls and lighting, joins the company as head of its electrical department . . . Consulting engineers Weinberger & Weishoff and Leichtman & Quinn form a new firm known as **Weinberger, Weishoff, Leichtman & Quinn,** consulting engineers, in New York City.

Richard R. Tipton, formerly with the Bureau of Public Roads, opens a civil engineering office in Berkeley, Calif., for designing bridges, highways and drainage structures . . . **M. K. Douglas,** former chief engineer of B.C. Concrete Co., Ltd., is named head of the new Vancouver office of A. B. Sanderson & Co., Ltd., Victoria, B. C., consulting engineers . . . **Theodore F. Smith,** former president of Oliver Iron and Steel Corp., Pittsburgh, joins Kaiser Engineers Division of Henry J. Kaiser Co. as industry consultant.

C. George Dandrow, who retired this year as president of the New York Building Congress, joins Johns-Manville Corp. as vice president for customer relations . . . **Albert W. Hainlin,** former University of Miami professor and director of its Housing Research Laboratory forms an engineering firm known as Albert W. Hainlin & Associates in Coral Gables . . . **A. Reid Chappel** is named supervising engineer, Sheraton Corp.

- **Education—Daniel A. Okum** is named head of the Department of Sanitary Engineering at the University of North Carolina . . . **Haaren A. Miklofsky,** formerly at George Washington University, joins the civil engineering faculty at Rensselaer Polytechnic Institute, where he will teach structural engineering . . . **J. B. Blackburn,** who has been conducting highway research at Purdue University, is appointed to the civil engineering staff at the University of Maryland.

Tractor-on-rubber spreads 30 to 35 truck-loads hourly for New York Thruway

To speed their work on the Herkimer Section of the New York Thruway, east of Utica, L. G. DeFelice & Son, Inc., North Haven, Connecticut, brought in a 186 hp rubber-tired Tournatractor.

360 to 420 yards hourly

This new unit is now helping move 4,000,000 yards of sand, clay, earth and shale. Some of the time, it works alongside the Erie Canal, where a dragline is excavating 15 to 20′ of muck to provide a stable base for the road. Tournatractor's job here is to backfill sand and gravel brought in by dump trucks. In typical operation, it spreads 30 to 35 loads (360 to 420 yards) hourly. Pushes vary from a few feet to 300 feet one-way. Dozer loads average 2½ yards each. Compaction is attained by rolling action of tires, plus back-blading with down-pressure on return portion of each cycle.

All-purpose tool

When caught up on this phase of the work, Tournatractor speeds at 19 mph to handle a wide variety of odd-lot assignments. In addition to backfilling, it helps other tractors spread scraper-dumped dirt . . . tows compressors and other equipment . . . cleans haul roads . . . and pushes or pulls trucks out of the mud. In final stages of earthmoving, Tournatractor will tow a 50-ton rubber-tired compactor.

"I like the Tournatractor very much as a push-tractor," says Foreman James Perkins. "It's also tops for spreading truck-dumped loads."

"I like Tournatractor's maneuverability," says Operator Charles L. Curran. "That down-pressure is really okay for back-blading."

Ask for a demonstration

No matter what size equipment fleet you have, no matter whether you move dirt with scrapers or trucks — or both — you'll find these three major Tournatractor advantages well worth considering:

1 Tournatractor's fast pushing speed, instant gear changes and 8 mph reverse enable it to do twice as much work as a crawler-tractor on most jobs.

2 Tournatractor reduces travel time between jobs by driving anywhere under its own power at speeds up to 19 mph.

3 Its four single-wheel units, with power traveling on sealed anti-frictions, require much less maintenance than crawlers with their 450 to 550 moving parts.

But check these advantages for yourself. Let us demonstrate a new, more powerful 208 hp Tournatractor on your job. Call or write us to arrange time and place.

Tournatractor—Trademark T-614-H-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

FOR REMOTE CONTROL JOBS on a great variety of CONSTRUCTION EQUIPMENT

TRU-LAY *Flexible* PUSH-PULLS

are Dependable and Accurate even under the most adverse conditions. They perform effectively under extremes of Heat or Cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls means the virtual Elimination of Maintenance.

Widely Used on Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on Tractors and their accessories, Power Shovels, Winches, Road Graders, Road Oilers, Dump Trucks, Snow Plows, Engine-driven Pumps, Rock Crushers, etc.

On Construction Equipment these dependable Push-Pulls are used for the remote control of Hydraulic and Air Valves, Brakes, Clutches, Transmissions, Throttles, Chokes, Governors, Power Take-Offs, and on many other applications.

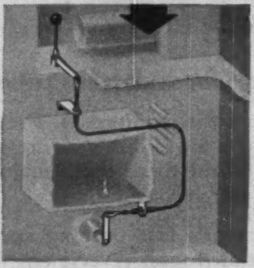
TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances up to 150 feet or more.

For full details, write for DATA FILE.

***Advantages** of Tru-Lay Push-Pull flexibility and simplicity are pictured below*

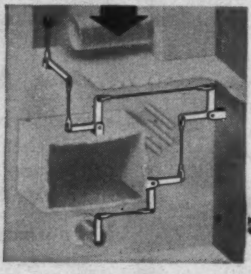
TRU-LAY PUSH-PULL

Simple • One Moving Part Life-Time Service • Life-Time Accuracy • Low over-all Cost Noiseless



MECHANICAL LINKAGES

Complex • Many Parts Many Points of Wear • Increasing Back-Lash • Loss of Accuracy • Vibration Rattles



"Solid as a rod but *Flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions as shown in the picture at the left . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, Accurate, Adaptable, Rugged . . . they are the ideal remote controls for Construction Equipment.

Our DATA FILE will answer your further questions Write for a copy without obligation

Push-Pull
DATA FILE

ACCO

AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

601-F Stephenson Bldg., Detroit 2
2216-F South Garfield Ave., Los Angeles 22 • 929-F Connecticut Ave., Bridgeport 2, Conn.

OBITUARIES

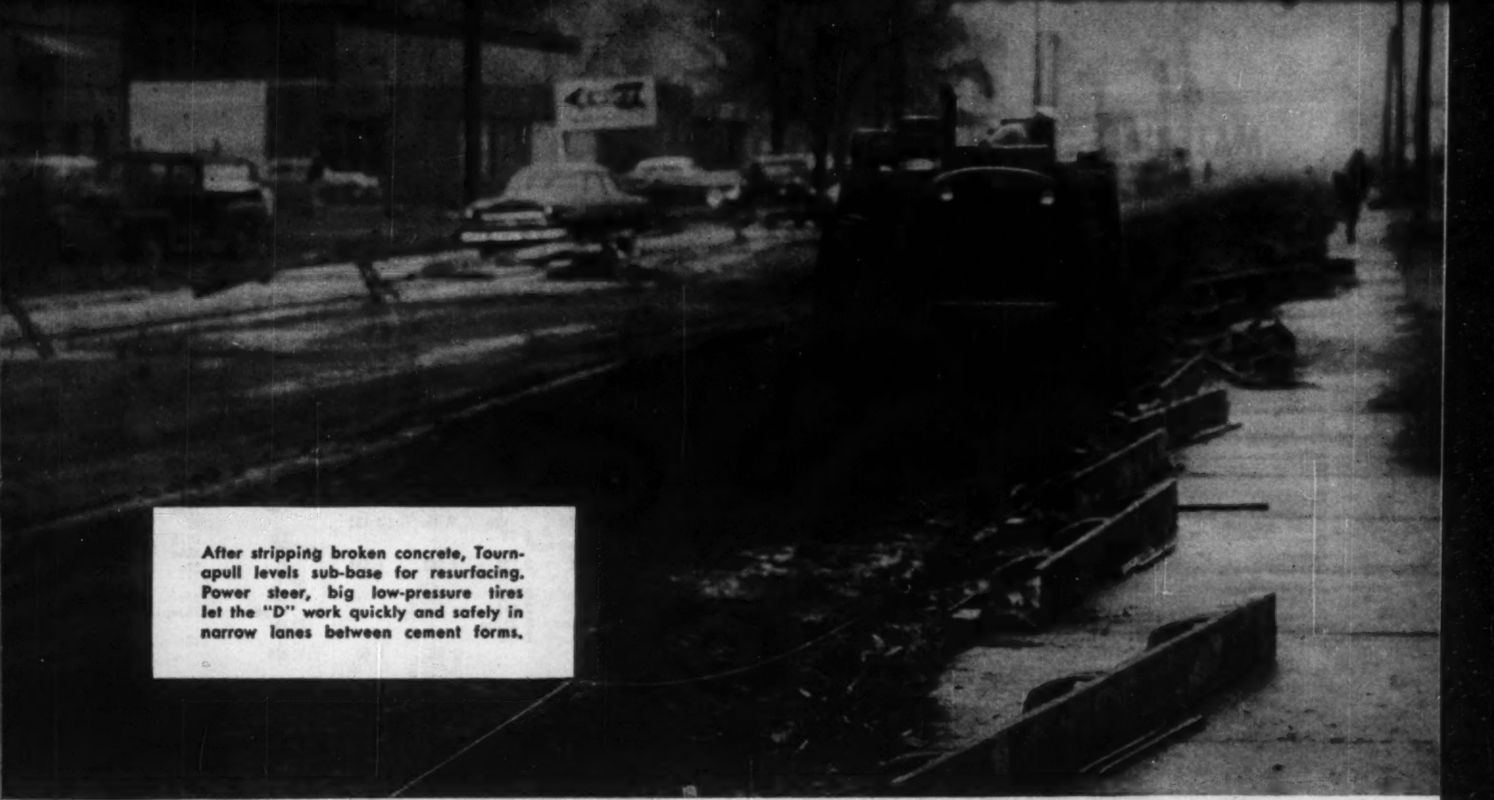
Frank J. Herlihy, 74, president of Herlihy Mid-Continent Co., Chicago building and construction firm, died Sept. 20. He was closely identified with Chicago construction for 30 years. His firm built most of Wacker Drive and its extensions, substantial portions of the Congress St. Expressway and is in the process of building six of Chicago's big parking garage prospects.

Charles M. Anderson, 70, New York civil engineer, died Sept. 21 at Gouverneur, N. Y. He was associated with the Brooklyn Edison Co. before going to northern New York to serve with the state highway commission on road construction. Later, he did survey work on subway construction in New York City.

Carl W. Brown, 69, chief engineer of the Missouri State Highway Department from 1939 to 1951, died Sept. 12, at Fulton, Mo. Brown, a former president of the American Road Builders' Association, was graduated from the University of Missouri School of Engineering where he was once honored as the school's most distinguished graduate.

John Schaaf, 68, active in engineering circles in the Buffalo, N. Y. area for many years, died Sept. 10. He was former superintendent of Hendrich Construction Inc., of Buffalo; president of San-Dis Engineering Corp., a sewage disposal engineering concern, and president of Schaaf Construction Co. He was a graduate of Massachusetts Institute of Technology.

James H. Griffin, 66, chief engineer of the New York City Transit Authority from 1945 until his retirement in June, 1955 and a member of the Authority's engineering staff since 1913, died Sept. 17. When he became the authority's chief engineer, he was the youngest man ever named to that post. His service with the Authority was interrupted from 1917 to 1919 when he served as captain with the 5th Engineers. Projects undertaken while he was with the Authority include extension of the IRT division into Brooklyn beyond Atlantic Ave., much of the extension of the BMT division and construction of the entire Independent division. Griffin received a civil engineering degree from Cooper Union College in 1912 and then worked as a surveyor, for one year, with the New York State Barge Canal.



After stripping broken concrete, Tournapull levels sub-base for resurfacing. Power steer, big low-pressure tires let the "D" work quickly and safely in narrow lanes between cement forms.

45% lower costs, 100% greater output

after scrapers replace dragline and trucks

Tearing out old pavement and grading roadways for resurfacing, Denton Construction Company of Detroit, Michigan, handles contracts more speedily . . . more profitably today than ever before. Prior to 1951, Denton moved the broken concrete and various subgrade materials with a ¾-yd. dragline and trucks. Then, they bought and began using 7-yd. D Tournapulls on the same work.

Here's what the record book shows after resurfacing 20,000 yards on Hazel Park streets; 7,000 yards on 8-Mile Road in Detroit; 40,000 yards on 9-Mile Road, and handling a number of smaller 500 to 1,000-yard contracts:

Where dragline-truck methods move an average 65 yards per hour, 2 D Tournapulls, working under same conditions, *move 130 yards per hour.* Cost records show that, doubling production, the 122 hp D Tournapulls reduce Denton's costs by 45 to 50% per yard!

Finish 500-yd. job in 4½ hours

On one longer-than-average 5300′ cycle, each "D" removed about 11 loads per 55-minute hour. Crawler-pusher was used to load the very tough, rough, sharp material. "D's" together delivered 110 bank yards per hour . . . finished 500-yard job in 4½ hours. Working 8 to 10 hours per day, 6 days per week, Denton's D Tournapulls have logged 90% mechanical efficiency.

"Good because of maneuverability . . ."

According to C. C. Leduman, General Superintendent, the Tournapulls drive through traffic from job-to-job at speeds up to 28 mph. Big 18.00 x 25 low-pressure tires do not damage pavement. Multi-disc air brakes on all 4 wheels activate 2822 square inches of braking surface for instant or controlled stops. Kingpin between prime-mover and trailing unit permits 90° power turns in radius of 12′8″. Job Foreman A. Schofield says, " 'D's' are good for our work because of their maneuverability, and their ability to move in close quarters between cement forms."

Now available — FREE — a valuable new reference book: "Earthmoving, An Art And A Science". Its 60 pages tell how to increase output and lower costs. Unbiased. Written by experienced field engineers; checked by veteran dirtmovers. For your copy, write LeTourneau-Westinghouse Company, Peoria, Illinois.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-591-H-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents
November Materials, and Labor Prices, will appear in November 10, 1955 issue

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots cash, dis. not deducted Paper	Bulk	Mortar	SAND AND GRAVEL Per ton, carload lots Gravel, 1½ in.	Gravel, ¾ in.	Sand	CRUSHED STONE Per ton, carload lots 1½ in.	¾ in.	CRUSHED SLAG Per tön, carload lots, f.o.b. plant 1½ in.	¾ in.	CONCRETE BLOCK 8x8x16-in." truckload del." per block Sand grav.	Lt. wgt. agg.	CONCRETE Ready Mixed 1:2:4 ove. 50 c.y., del.
Atlanta	$3.97a	$3.56a	$3.40	$2.75	$2.75	$2.50‡	$2.14	$2.24	$1.45	$1.65	$0.18	$0.195	$12.25g
Baltimore	4.16a	3.75a	3.63	2.70‡a	2.70‡a	2.20‡a	2.75‡a	2.80‡a	1.95‡a	1.90‡a	.18	.18a	12.15
Birmingham	3.72	2.75e	....	2.53n	2.53n	2.08n	2.75	2.75	1.35	1.55	.165	.165	11.00
Boston	4.47b	4.11b	4.06	3.00a	3.00a	3.00a	1.60a	1.75a	....	....	.23	.265a	13.00h
Chicago	3.73a	3.32a	3.35	3.60‡b	3.60‡b	3.75‡b	3.50‡b	3.50‡b	2.25‡	2.25‡	.23	.23b	13.00
Cincinnati	3.95c	3.55c	3.73	2.19‡c	2.24‡c	2.24‡c	2.54‡c	2.54‡c	....	....	.195	.225a	11.60
Cleveland	N.A. in C.L.	3.34e	....	2.05ej	1.85j	1.65	4.10‡a	4.10‡a	3.35c	3.15‡	....	.22	15.45
Dallas	3.15a	2.85a	2.93	2.18	2.28	1.84	2.22	2.38	....	....	.11e	.2675	9.40
Denver	4.44a	3.94a	4.44	1.85	2.00	1.20	....	....	....	....	.23	.255a	10.50
Detroit	3.89a	3.30a	3.54	4.50‡b	4.50‡b	4.00‡b	3.75‡	3.75‡	4.25‡	4.25‡	.21	.22a	12.80
Kansas City	4.10b	3.90b	3.90	1.65	1.65	2.00‡a	2.00‡a	2.00‡a	....	....	.20a	.24c	12.75b
Los Angeles	4.92ch	4.46ch	5.40	2.31‡a	2.51‡a	2.31‡a	2.16‡a	2.31‡a	....	....	.145jm	.255m	12.46lh
Minneapolis	4.20a	3.79a	3.71	2.70‡ag	2.70‡ag	1.60‡ag	3.25‡ag	3.25‡ag	....	....	.19	....	12.75f
Montreal	3.11d	2.86d	....	2.20a	2.20a	2.25a	1.90i	2.20i	....	....	.17	.17a	10.80ek
New Orleans	3.55a	3.40a	3.48	2.44	2.44	2.00	....	....	1.45	1.65	.275	....	12.90
New York	4.26a	3.85a	3.63	3.05bk	3.05bk	2.00bk	2.80bl	2.80bl	....	....	....	....	15.50an
Philadelphia	3.73/4.12‡a	3.42/3.79‡a	3.58/3.63‡	2.85‡op	2.85‡op	2.35‡op	2.45‡	2.55‡	2.00	2.35	.22/.26	....	13.20de
Pittsburgh	3.75a	3.56a	3.75	2.40‡	2.40‡	2.20‡	2.60‡	2.60‡	2.15	2.15	.25d	.31	14.00
St. Louis	3.70/3.93c	3.25/3.51c	3.55/3.72	3.00am	3.00am	2.40/3.00am	1.60j	1.70j	1.50	1.50	.22	.28c	12.90
San Francisco	3.83c	3.39c	....	2.07	2.07	2.17	2.22	2.22	....	....	.21	.28cl	12.15c
Seattle	4.80a	3.55a	5.95h	3.50‡bm	3.50‡bm	3.50‡bm	4.00‡bm	4.00‡bm	....	....	.26	.3515	12.30i
Toronto	4.00	3.77	4.00	2.25	2.25	1.85	2.00	2.00	2.00	2.00	.25	.35c	14.95

‡ Delivered. * Prices incl. dealers discount except as noted.

CEMENT: *a Less 10¢ disc, 15 days. *b Less 2% disc, 15 days. *c Less 10¢ disc, 10 days. *d Truckload lots, deliv. 10¢ disc, 20 days. *e Truckload lots, destination price. *h LCL.

SAND GRAVEL, STONE & SLAG: *a Truck lots. *b Per cu. yd. *c 5 tons or more. *e ½". *f Pea gravel. *g Less 5% for cash. *h Less than 5 tons. *i Sales tax incl. *j F.o.b. quarry. *k Barge lots asd. *l F.o.b. scow Hudson river. *m Less 2% for cash. *n F.o.b. cars. *o 1–3 mi zone. *p Add 10¢ for ea. add'l mi zone.

CONCRETE BLOCK: *a Cinder *b Waylite. *c Haydite. *d Celocrete *e 5¼ x 8 x 12 in. *f 8 x 4 x 16. *g F.o.b. truck at job. *i Less 2% for cash *l F.o.b. plant San Rafael. *m F.o.b. yard.

READY MIXED CONCRETE: *a 5 cu. yds. or over del. Man. *b 25 cu. yds or more. *c 10–100 cy. brackets. *d 1–3 mi. zone. *e 2,000 lb comp. *f 2,500 lb. comp. *g Less 25¢ disc, 15 days. *h Less 50¢ for cash. *i 5% off for cash. *j 2% off for cash. *k Federal tax included. Add 5% mum. & prov. *l 1:2½:3½. *m F.o.b. yard. *n Plus escalator clause. *o Add 15¢ for ea. add'l 3-mi zone.

CASH DISCOUNTS CEMENT to Contractors: Truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10¢ per bbl. for payment within 15 days of date of invoice. Subject discount 10¢ per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICES AT CEMENT MILLS

Charge for bags not included. For paper bags add 40¢ per bbl., not refundable.

	Bulk		Bulk		Bulk		Bulk		Bulk
Richard City, Tenn	$2.90†	Buffington, Ind	$2.85†	Steelton, Minn	$2.95†	Muskegon, Mich	$3.00†	Toledo, O	$2.90†
Clinchfield, Ga	2.90†	Independence, Kan	2.80†	Leeds, Ala	2.75†	Saginaw, Mich	3.00†	Milwaukee, Wis	3.05†
Kingsport, Tenn	2.90†	Hannibal, Mo	2.85†	Duluth, Minn	2.95†	Wyandotte, Mich	3.00†	Green Bay, Wis	3.05†
West Des Moines, Iowa	2.95†	Northampton, Pa	2.90†	Hudson, N. Y	2.75†	Buffalo, N. Y	3.25†	Ironton, O	2.90†
Nazareth, Pa	2.90†	Universal, Pa	2.95†	Alpena, Mich	2.90†	Oswego, N. Y	3.15†	Montreal City	2.56
Bath, Pa	2.90†	Waco, Tex. (+ 10¢ tax)	2.85†	Detroit, Mich	3.00†	Cleveland, O	2.95†	W. Winfield, Pa	3.00†

† *Prices to hold for fourth quarter of* 1955.

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F. O. B. CITY

	PAVING BRICK AND BLOCK Granite Per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	PAVING ASPHALT Per ton, less than 80 penetration Tank car	Drums	ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration Tank car	Drums	CUTBACK ASPHALT MC per ton Tank car	Drums	ROAD OIL Per gal. Tank car	ASPHALT EMULSION RSI Per gal. Tank car	Drums
Atlanta	......	......	......	$26.00	$33.25	$0.115	$0.23	$0.125Pw	$0.27Pw	$0.15	$0.15	$0.25
Baltimore	150.00‡	75.00‡	......	21.00i	......	.085i	0.175i	.09iwE	.18iwE	.09i	.095i	0.185i
Birmingham	......	57.50i	......	......	......	......	......	......	......	......	......	......
Boston	......	......	......	22.00a	23.00a	22.00av	22.00av	.09aF	......	.10a	.145aG	.22aG
Chicago	155.00‡	85.00‡b	3.50/3.55‡j	20.85b	30.85b	19.85bv	29.85bv	.094bwH	.1740bwH	.0775b	......	......
Cincinnati	......	......	......	......	......	......	......	......	......	......	......	......
Cleveland	200.00	73.00d	5.03g	23.00A	......	23.00A	......	.1025AwF	......	......	.1025AG	.18AG
Dallas	e	40.00	e	24.05	43.09	.1016	.2103	28.91	50.44	.098	.1087	.1960
Denver	......	50.00	......	......	......	......	......	......	......	......	......	......
Detroit	......	104.00	......	27.21	......	27.21v	......	.1188wI	......	.0966	......	.211
Kansas City	e	e	e	15.00cl	......	17.50r	......	.07CwJ	......	.055c	0.11	......
Los Angeles	e	......	e	16.00dmx	......	16.00dvx	......	18.00dxK	......	17.00dv	.0825j	.1725j
Minneapolis	......	......	2.97h	25.00	......	25.00	......	0.105w	......	0.095	.1075	......
Montreal	e	e	e	27.00n	39.60n	.135n	.198n	16.50nuE	20.90nuE	.132n	.197ns	.239ns
New Orleans	......	......	......	17.50e	......o	17.50ex	......o	.085ew	......o	.085B	.085BI	......
New York	......	......	2.85f	23.89qCD	44.32qD	22.89vtCD	43.57vtD	.1023wCDF	.1889wDF	......	.1023CD	.1918B
Philadelphia	175.00	110.00	4.06	22.00	......	......	......	.09uF	......	......	......	......
Pittsburgh	165.00	48.00	4.60	27.00	38.00	.10	.21	27.00E	40.00E	098	.11	.224
St. Louis	......	......	......	18.76f	......	.1704	......	0863wM	......	0.1575	.10	......
San Francisco	......	67.50c	......	17.50g	33.00g	17.50gkv	33.00gkv	20.00gN	37.50gN	18.75v	.085y	......
Seattle	......	......	......	17.50h	38.00h	17.25hv	......	24.50K	......	19.75hv	.085h	.095hr
Toronto	......	......	4.03	23.80	46.67	0.19	0.24	0.20w	0.25w	0.17	0.20	.24

h Delivered.

PAVING BRICK & BLOCK: *a CL. *b 3 x 4 x 8. *c 2¼ x 8¼ x 4. *d LCL, truck deliveries. *e Not used. *f 2" interior 6# treat. *g 3" *h 2" tr, 8# *i 3 x 3⅝ x 8½. *j 2½", 6 lb. tr.

ASPHALTS: *a Price at plant, Everett, Mass. *b F.o.b. refinery, Lockport, Ill. *c F.o.b. Sugar Creek, Mo. *d F.o.b. refinery, El Segunda. *e F.o.b. Baton Rouge. *f F.o.b. Hartford. *g F.o.b. Richmond, Calif. *h F.o.b. Martinez. *i F.o.b. refinery, Baltimore. *j F.o.b. refinery, Inglewood, Calif. *k 50–110 penetr. *l Less than 100 penetr. *m 40/80 penetr. *n Tax incl. *o Drums not avail. Shipped in steel bbl. *q 40/85 penetr. *r In customer's drums. *s Shipped in drums, per drum. *t 85/200 penetr. *u Per 100 gal. *v Per ton. *w Per gal. *x Also tank trucks. *y F.o.b. Oakland. *A F.o.b. refinery, Cleveland. *B F.o.b. Destrehan, La. *C Bulk. *D Prices based on transporting to Manhattan via truck. *E RC. *F Also RC. *G Also MS, SS. *H RC 0–5 incl. *I MC 4. *J MC, RC .0675. *K MC 3, 4 & 5. *L MS. *M MC 1–5, RC 1–5, .089. *N MC 3. *P F.o.b. refinery Savannah: $0.09/gal., tank cars; $0.20/gal., drums.

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES—	PLATE CARBON STEEL	REINF BARS billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$4.60	$4.50	$4.65	$9.25	......	$94.50	$113.00	$5.825	$7.90	$5.625	......
Chicago Area	4.60	4.50	4.65	9.25	$5.45	94.50	113.00	5.825	7.90	5.625	......
Pittsburgh Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	$11.50
Buffalo Area	4.60	4.50	4.65	9.25	5.45	94.50	113.00	5.825	7.90	5.625	11.50
Cleveland	......	......	4.65	9.25	5.45	......	......	......	......	......	11.50
Youngstown Area	......	......	4.65	......	......	......	......	......	7.90	......	......
Geneva	4.60	4.50	......	......	......	......	......	......	......	......	......
Los Angeles	......	......	......	......	5.45	......	......	......	7.90	......	......
Pueblo	4.90	5.35	5.10	......	......	......	95.00	5.825	7.90	5.625	12.40

IRON AND STEEL PRODUCTS—F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Rail steel	EXPANDED METAL LATH k Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATH k Std. ribbed 3.4 lb.
Atlanta	$7.63	$7.42	$7.42	$38.00‡	$42.00‡
Baltimore	7.63	7.00j	....	44.00	47.00
Birmingham	7.28t	7.08t	7.08t	51.00p	57.00p
Boston	8.13a	7.82	7.82	44.00	48.50
Chicago	7.28	6.23gu	6.23gu	49.00‡	60.00‡
Cincinnati	7.75ak	7.56rv	....	41.00mr	45.50mn
Cleveland	7.91	6.41c	....	41.00‡	45.50‡
Dallas	9.05	7.25	7.25	49.00	52.00
Denver	8.75	7.80c	....	54.00n	60.00n
Detroit	7.75	8.02	....	55.50	66.00
Kansas City	7.95a	7.75	....	49.00	60.00
Los Angeles	8.15fd	7.60	....	54.50	60.50
Minneapolis	7.64d	8.06b	8.06b	42.50	47.00
Montreal	7.70–8.15iC/7.75–8.15A	6.75/8.15i	6.75/8.15	46.00h	51.00h
New Orleans	....	6.20akz	....	66.00	60.00
New York	7.77	7.35v	7.35y	44.50no	51.00no
Philadelphia	7/7.15	7.30/7.45	....	38.00‡	42.00‡
Pittsburgh	6.98	7.37x	6.95	39.78	41.90
St. Louis	7.68s	6.75c	6.75c	55.00l	56.00l
San Francisco	8.20	7.45j	....	44.00	52.25
Seattle	5.35e	7.00cj	....	53.50nr	59.50nr
Toronto	8.40*	6.55	6.55	53.50n	67.50n

Quantity extras, per cwt: under 100#, +$6; 100–399#, +$3; 400–999#, +1.25; 1000–1999#, +30¢; 2000–4999#, base price; 5000–9999#, –10¢; 10,000–19,999#, –30¢; 20,000–29,999#, –50¢; 30,000# and up, –70¢

EXTRAS, per cwt—*Quantity: less than 700#, +50¢; 700–1499#, +25¢; 1500–7999#, +10¢. *Size†: #2 +$2.20; #3 +$1.10; #4 +80¢; #5 +62.5¢; #6, #7 +45¢; #8, #9, #10 +30¢. *Bending: heavy, +80¢; light, +$2 (except in New York City and surrounding metropolitan area where bending must be done on the job). *Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–500 tons, +50¢ but not over $4500; 20–200 tons, +60¢ but not over $2000; 5–20 tons, +70¢ but not over $240; under 5 tons, +85¢ but not over $70. *Design only: +60¢.

WELDED FABRIC REINFORCING
Per 100 sq ft., carload lots fob mill

4 × 16 in., No. 5 & 10 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa. $3.40

4 × 12 in., No. 8 & 12 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa. $2.47

6 × 6 in., No. 6 & 6 wires—
Joliet, Ill., Donora, Pa., Monessen, Pa. $3.57

*‡ Delivered *a 2000-9999# *b 10,000–15,999#, fob city *c 20 tons or over *d 10,000–19,999# *e fob plant *f incl. delivering in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add dominion, provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p del. of 500 sq. yd. or more. *r 2% off for cash *s 2,000–4,999# *t add 15¢ del. *u add 6.25¢ switch *v incl 15¢ del. *x add 5¢ switch *y add 30¢ del. *z add 10¢ del. *A American made. *C Canadian made. † Number system replaces inch system of classifying bar sizes. New system is based on number of eighth inches in diameter of bar. ** Aver. of Canadian & American.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEX a	ASBESTOS CEMENT PIPE per lin. ft. f.o.b. city 6" Pr Cl. 150	ASBESTOS CEMENT PIPE 12" Sew Cl. I	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13-44T std. 8 in. s.s.	VITRIFIED SEWER PIPE std. 12 in. s.s.	VITRIFIED SEWER PIPE 24 in. ds.	VITRIFIED SEWER PIPE 36 in. ds.	CLAY DRAIN TILE ASTM C4-24 PER 1,000 ft., carload lots, f.o.b. 6 in.	CLAY DRAIN TILE 8 in.	CONCRETE SEWER PIPE Per ft., delivered: ASTMC 14-41 12 in.	CONCRETE SEWER PIPE 24 in.
Atlanta	113.6	$1.52	$2.53	$.545	$1.27	$4.82	$12.925	......	......	$0.90m	$3.40m
Baltimore	122.9	1.52	2.53	.574	1.07	4.455v	11.7875	$178.20	$274.80	.99	2.70
Birmingham	109.3	1.52	2.53	.42	.75	3.30w	10.50w	260.00‡	400.00‡	1.25m	2.75m
Boston	125.5	1.54	2.32	.609qrt	1.1745qrt	4.815qrt	12.505qrt	187.80r	289.20r	1.54mg	3.65mg
Chicago	126.0	1.52	2.32	.77m	1.48m	6.25m	19.00m	150.00‡	270.00‡	1.00	3.65
Cincinnati	119.5	1.54	2.40	.644t	1.242t	4.77t	12.1975	240.00	370.00	.80m	2.95m
Cleveland	126.8	1.54	2.40	.546s	1.053s	4.32t	11.48t	158.00m	245.65m	.85m	3.25m
Dallas	125.7	1.54	2.66	.439	.799	4.00b	9.17b	......	......	.49	1.60
Denver	131.4	1.62	2.66	.45n	.78n	3.48n	......	......	......	.74m	2.50m
Detroit	126.8	1.54	2.40	.80	1.50	5.95	16.40	240.00m	370.00m	.95	3.82
Kansas City	124.7	1.54	2.40	.56	1.00	4.13	11.20	250.00	480.00	.90	3.25g
Los Angeles	131.1	1.62	2.32	.67l	1.46l	5.97l	14.89l	228.20l	348.90l	.95	2.75f
Minneapolis	131.0	1.57	2.53	.76mo	1.38mo	5.70mo	......	......	......	1.66h	4.47h
Montreal	......	....	....	1.07u	1.73u	5.52u	8.93u	......	......	1.17h	3.11j
New Orleans	116.0	1.52	2.53	.51	.925	4.91	......	280.00p	460.00p	.65	2.29
New York	121.5	1.54	2.32	.85	1.62	6.33	16.49	......	......	1.15	3.00
Philadelphia	120.9	1.52	2.32	.67	1.29	5.08v	12.65v	300.00‡	350.00‡	1.60h	3.95hj
Pittsburgh	127.5	1.54	2.32	.468m	.864m	3.86m	9.78m	152.00	244.00	1.05h	2.50i
St. Louis	120.5	1.52	2.40	.56	1.03	4.22	9.80	180.00l	380.00l	1.30il	2.80il
San Francisco	131.1	1.62	2.32	.74d	1.62d	6.59d	16.47d	235.00l	392.00l	1.05m	3.30n
Seattle	131.1	1.62	2.32	.51b	.91b	....	......	150.00c	......	.90k	2.85k
Toronto	......	....	....	.76	1.425	5.70	......	157.00	280.00	.87	3.05

*WROUGHT STEEL PIPE
(Full standard weight)
Discount from list: see footnote

Mill	2½ & 3 in., Butt Weld† Black %	2½ & 3 in., Butt Weld† Galv. %	3½ to 6 in., Lap Weld† Black %	3½ to 6 in., Lap Weld† Galv. %
Lorain, Ohio	28.00	10.75		
Aliquippa, Pa	28.00	14.25	18.50a	4.25a
Sparrows Pt., Md	26.00	8.75	13.50a	+4.25
Benwood, W. Va	28.00	10.75	17.50d	+0.25d
Youngstown, O	28.00	10.75	......	......
Indiana Harbor, Ind	27.00	9.75	17.50ab	+0.25a
Sharon, Pa	28.00	10.75	......	......
Wheatland	28.00	10.75	16.50a	+1.25a
Etna, Pa	28.00	14.25	17.50d	3.25d
Fontana, Calif	16.50b	2.75b	7.00ab	+7.25ab

† Threaded and coupled. a 3½ to 4 in. b Continuous weld. c 5 and 6 in. d 6 in.

** Delivered. *a BEGINNING 8/4/55 PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 109.3; Burlington, N. J., 118.1. *b Extra strength ASTM C 200-44T *c 4-in., $90 *d SS361-A *e 30-in. *f 21 in. *g culvert pipe; reinforced, ASTM C 76-41 *h reinforced, ASTM C 75-41 *i reinforced, ASTM C 76-37 *j centrispun; no standard specs. in Canada *k 2% off for cash *l fob plant *m truck delivery *n LCL delivered, fob truck *o listed price based on ASTM C 76-37 *j centrispun; no standard specs. in Canada *k 2% off for cas *l fob plant *m truck delivery *n LCL delivered, fob truck *o listed price based on LCL (no min.) *p freight allowed to destination in city *q ASTM C 13-40 *r CL fob origin, freight allowed *s 2 ft lengths *t 3 ft lengths *u CESA A 60-1941 specs. used *v standard strength *w ss; add 20% for d.s.

* **WROUGHT STEEL PIPE:** Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft.("based on approx. $200 per net ton): Butt Weld ⅛ in., 5½¢; ¼ in., 6¢; ⅜ in., 6¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in.. 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., 37¢; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢;4 in., $1.09; 5 in., $1.48; 6 in., $1.92. Add freight rates plus 3% transportation tax to get destination price.

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 50.25, galv.. + 78.50; 1¼ in. black, + 50.25, galv. + 78.0, 1½ in. black, + 46.75 galv. + 74.25; Lap Weld —2½ in. to 3 in. black + 52.50 galv. + 78.50; 4½ in. to 6 in. black + 49.50 galv. + 73.75 Add freight rates plus 3% transportation tax to get destination price.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

SHORT LEAF YELLOW PINE AND DOUGLAS FIR

All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)

All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft.

(Prices in italics)

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR									LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	5/8"	3/4"
Atlanta †	$78.00	$80.00	$75.50	$74.00	$77.50	$81.00	$79.00	......	......	......	......	$22.32	$27.24
Baltimore *	92.00	97.00	94.00	94.00	95.00	102.00	112.00	......	......	$170.00	$185.00	25.92	31.60
	132.00g	*132.00g*	*132.00g*	*132.00g*	*132.00g*	*132.00g*	*138.00g*	*$145.00*	*$145.00*	......	......	......	......
Birmingham †	81.50	83.50	80.50	87.50	90.50	95.50	100.50	......	......	120.50	165.50	21.78	26.58
	105.00	*105.00*	*108.50*	*108.50*	*108.50*	*105.00*	*105.00*	*105.00*	*105.00*	......	......	......	......
Boston *	101/107a	110/115a	105.00a	105.00a	105.00a	105.00a	......	......	......	......	......	25 92	31.60
[3]	*93.00n*	*93.00n*	*123.00*	*123.00*	*123.00*	*123.00*	*129.00*	*129.00*	*129.00*	......	......	......	......
Chicago **	97.00	100.00	93.00	108.00	116.00	117.00	112.00	......	......	140.00	140.00	22.45	27.37
	104.00	*104.00*	*115.00*	*115.00*	*115.00*	*116.00*	*123.00*	*123.00*	*123.00*	......	......	......	......
Cincinnati *	93.75	94 75	83.00	90.50	94.75	103.00	110.50	......	......	131.75	131.75	25.00	30.48
	101.75	*104.00*	*113.50*	*115.00*	*116.50*	*116.75*	*140.00*	*140.00*	*140.00*	......	......	......	......
Cleveland **	96.00	98.00	103.00	102.00	102.00	103.00	......	......	......	......	......	25.37	30.93
	......	......	*118.00*	*119.00*	*119.00*	*120.00*	*129.00*	*129.00*	*129.00*	......	......	......	......
Dallas k‡	72.00	78.00	68.50	68.50	73.50	65.50	130.00	......	......	127.50	134.50	18.72	22.80
Denver *	*Not in stock*		*121.50*	*122.50*	*122.50*	*122.50*	*125.00*	*137.75*	*140.50*	......	......	13.92	16.98
Detroit ‡	115.00	118.00	108.00	115.00	118.00	118.00	......	......	......	......	......	25.00	30.48
	125.00	*125.00*	*134.00*	*130.00*	*130.00*	*130.00*	*175.00*	*190.00*	*190.00*	......	......	......	......
Kansas City *	130.00	130.00	125.00	130.00	135.00	145.00	......	......	......	......	......	16.56	20.16
	135.00	*135.00*	*135.00*	*139.00*	*139.00*	*140.00*	*160.00*	*180.00*	*205.00*	......	......	......	......
Los Angeles [1]	*107.00*	*107.00*	*107.00*	*107.00*	*107.00*	*107.00*	*121.00*	*131.00*	*121.00*	......	......	16.61ab	20.25ab
Minneapolis ♯	*135.00*	*135.00*	*140.00*	*140.00*	*140.00*	*140.00*	*175.00*	*175.00*	*175.00*	......	......	19.89	24.25
Montreal ab	92.00	100.00	92.00	92.00	110.00	125.00	......	......	......	105.00	105.00	......	......
	170.00	*170.00*	*170.00*	*170.00*	*170.00*	*170.00*	*142.00*	*142.00*	*142.00*	......	......	......	......
New Orleans †	100.00	100.00	94.50	85.00	90.00	94.00	118.50	......	......	150.00	148.00	18.72	22.80
†	*117.50*	*117.50*	*120.00*	*127.50*	*127.50*	*127.50*	*140.00*	*140.00*	*140.00*	......	......	......	......
New York [2]	112.50	115.50	125.00	127.50	127.50	127.50	167.50	......	......	250/270	250/270	25.92	31.60
	......	......	*127 50*	*127.50*	*127.50*	*127.50*	*165/175*	*170/180*	*170/180*	......	......	......	......
Philadelphia ‡		Range from $117.00 to $137.00				117/137	117/137	......	......	214/224	214/224	25.92	31.60
		Range from $131.00 to $163.00				*131/163*	*136/158*	*158.00*	*158.00*	......	......	......	......
Pittsburgh †	110.00	110.00	110.00	110.00	110.00	110.00	123.00	......	......	120.00	130.00	25.92	31.60
	127.00	*127.00*	*135.00*	*135.00*	*138.00*	*138.00*	*130.00*	*145.00*	*145.00*	......	......	......	......
St. Louis ‡	117.00	122.00	126.00	128.00d	138.00e	141.00e	......	......	......	......	......	18.72	22.80
	......	......	*139.00i*	*140.00e*	*140.00e*	*144.00e*	*207.00e*	*207.00*	*207.00*	......	......	......	......
San Francisco A	*82.00*	*82.00*	*92.00*	*92.00*	*92.00*	*92.00*	*109.00*	*122.00*	*147.00*	......	......	12.22	14.91a
Seattle †	*75.00*	*75.00*	*75.00*	*75.00*	*75.00*	*75.00*	*86.00*	*86.00*	*96.00*	......	......	......	......
Toronto a	97.00	100.00	98.00	97.00	103.00	105.00	120.00	......	......	106.00	......	......	......
	135.00	*118.00*	*118.00*	*128.00*	*128.00*	*128.00*	*133.00*	*138.00*	*138.00*	......	......	......	......

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. ♯ Retail, LCL, deliv. 2. Deliv. truck lots. 3. asd.

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Tax exempt. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *g No. 1 common. *j 8ft. lengths. *k No. 3 common. *n †3. A incl rail rate from North west mills to San Francisco are $11.50 to $15.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures.

PLYWOOD: Interior Fir Plywood, 4′ by 8′ panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on 5/8", $170.00; on 3/4", $191.00. Exterior 5/8", $190.00, 3/4", $212.00. For other centers add rail freight increment from table on proper size. Oiling and edge sealing charges included. *a Lower rate by water shipment. *b 50,000 lb. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Thickness		EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*
	A quality	B quality	
Atlanta	79%	80%	$0 2465
Baltimore	78%d	80%d	.2465
Birmingham	82%	83%	.1915
Boston	75–10%	75–10%	.2465
Chicago	74%	74%	.2465
Cincinnati	76%	76%	.2465
Cleveland	74–10–10%	74–10–10%	.2865
Dallas	75%	75%	.2540
Denver	73%	73%	.2515
Detroit	74–10–10%	74–10–10%	.2465
Kansas City	76–10%	76–10%	.2515
Los Angeles	71%	78%	.2490
Minneapolis	73–10%	73–10%	.2515
Montreal	40–10–5%bc	40–10–5%b	21.35h
New Orleans	78%	79%	.2515
New York	80–2½%	80–2½%	.4125g
Philadelphia	77%	79%	.2465
Pittsburgh	78%	78%	.2465
St. Louis	80–10%	80–10%	.2515
San Francisco	61%	69%	.2465
Seattle	73%	76%	.2490

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b Discount from list, Apr. 1951; sales tax included, but 6% tax exemption not allowable for. *c Single thickness. *d Discount 6/15/52. *e Discount eff. 12/31/54.

Explosives: * Cartridges of 1¼", 1½", 1¾", 2", 2¼", 2½", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. *g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. *h F.o.b Beloeil (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.10

40% Ammonia Gelatin price ranges in other than urban areas, per lb.
(except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me	$0.1915	$0.2265	$0.2465
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.1965	.2315	.2515
Rocky Mtn. States	.1965	.2315	.2515
Pacific N. W. States	.1940	.2290	.2490
Pacific S. W. States	.1915	.2265	.2465

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	By Rail Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	....
12-in.—2-ft. from butt	6-in.	50 to 59-ft.	.54	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	.50/68	....
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	.78/.88	.93
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.83/93	.94
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	1.02

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

		6" x 8" x 8′		7" x 8" x 8′6"	
		Untr.	Tr.	Untr.	Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	.....	3.45a	.....	4.30a
New York	S. L. Sap Pine	2.00	4.00	3.00	5.00
	Mixed Oak	2.50	4.50	3.50	5.50
Philadelphia	Red Oak	2.95/3.70	4.50/5.75	3.58/3.90	5.50/5.75
St. Louis	White Oak	2.25	.....	2.75	.....
	Red Oak	2.15	2.70a	2.60	3.25a
	Sap Pine or Cypress	.....	2.60a	.....	3.20a
San Francisco	Douglas Fir	2.41ef	3.32ef	3.48bf	5.10caf

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 7" x 9" x 8′. *c* Empty cell. *e* Green. *f* f.o.b. cars. * Add 75¢/tie freight charge to Birmingham; 35¢ from Montgomery.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.103
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton	29.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	2.30
Soda ash, 58%, in paper bags, per 100 lb. dense	1.70
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	14.90

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STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over,			BRICK Per M. in quantity		LIME Per ton, in paper, Carload lot,		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$139.75	$139.75	$279.55	$314.45	......	......	$30.00	$30.00	......	......	.....
Baltimore	202.00	216.00	404.00	458.00	594.00	679.00	36.00k	41.00k	33.00	21.50	.....
Birmingham	126.00p	142.00p	253.00p	284.00p	354.00	438.00	27.00ff	32.00gg	29.25	24.00	.....
Boston	196.00†	209.00†	392.00†	283.75†	......	......	36.85p	40.35p	30.00†	28.00†	.....
Chicago	135.00	145.00	280.00	......	......	......	28.00	30.00	36.00	29.00	.....
Cincinnati	205.00j	215.00j	295.00jdd	......	......	......	45.00j	46.00j	27.50j	27.50j	.....
Cleveland	187.50**	200.00**	......	......	......	......	39.75	39.75	29.75	24.75	33.50ee
Dallas	......	118.00	......	......	......	......	19.75	32.25	32.00	21.80	.....
Denver	......	......	......	......	......	......	34.00	41.00	34.80bb	28.00bb	34.00bb
Detroit	130.00	138.00	259.00	......	315.00	360.00	40.50cc	41.00cc	36.00	32.00	.....
Kansas City	127.50	147.50	270.00	270.00	340.00	400.00	29.25	29.25	32.00	27.50	28.50
Los Angeles	r	r	r	r	r	r	27.50§	......	34.00	34.00	35.00
Minneapolis	181.00p	201.00p	414.00p	201.00pw	......	......	41.00*p	47.00	40.00bbe	30.00bbe	42.00bbds
Montreal	165.00aq	181.00au	325.00au	230.00	248.00s	......	39.50	46.00	39.20	22.00	13.75u
New Orleans	170.00	170.00	310.00	380.00	......	......	31.00	.....	.....	28.00	28.00
New York	151.90h	162.00h	222.70ch	245.40hn	......	......	41.00	......	36.00	34.00	.....
Philadelphia	156.30	166.80	312.70	375.20	......	......	30/34	34/40	27.60	25.60	3.17
Pittsburgh	138.00	156.00	260.00	228.00	297.00	341.00	36.00	46.00y	25.00	23.00	2.97m
St. Louis	147.00cc	168.50cc	338.25cc	465.00cc	446.00	621.50	41.50sl	43.00s	.95saa	.75saa	1.30aaspee
San Francisco	156.85a*	177.10a*	235.30dda*	......	......	......	39.50	......	26.60	26.60	28.25
Seattle	225.00cc	250.00cc	350.00	250.00ccw	......	......	42.00s	54.00s	42.00shh	37.50	3.90mhh
Toronto	138.70	148.90	273.75	222.00f	......	......	41.50	59.00	40.50	33.50	29.00

•† F.o.b. yard Roxbury. •a Smooth. •b Per 50 lb. bags. •c 6 x 12 x 12 in.-3 cell. •d Pulverized hot. •e 5%, 10th following month. •f 8 x 8 x 12. •g 5½ x 8 x 12. •h F.o.b. trucks, job site N.Y.C. •j Truck load or over. •k $1.00 discount. •l Red face. •m Per bbl., 180 lb. •n 7¾ x 7¾ x 12. Speed title. •p Truck lots. •q Provincial and Municipal tax extra. •r Not used because of earthquake danger. •s 2% discount for cash. •t 5½ x 8 x 11¼. •u Tax exempt. •v Sand lime. •w 5 x 8 x 12. •y Stacked. •z Pebble lime price per 80 lb. sack. •aa Price per sack. Lime not sold per ton. •bb LCL. •cc Truck delivery. •dd 6 x 12 x 12. •ee Pebble lime. •ff 80% common. •gg Select. •hh lcl. § F.o.b. yard. •** Warehouse delivery. •* F.o.b. Stockton.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl.	WHITE LEAD Per 100 lb. in 100 lb. cases	READY-MIXED PAINT Per gal., drums			ROOFING SUPPLIES; Carload lots f.o.b. factory				
	Dry a	in oil w	Graphite b	Aluminum c	Ferric Oxide d	Rolls, slate surfaced, 85-90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$18.25	$28.275	$3.26	$3.51	$3.01	$3.10	$2.91	$2.91	$0.60	$55.00
Baltimore	18.00	27.90	2.75	4.25	3.35	2.42	3.73	3.73	.44	48.32
Birmingham	18.25	28.275	3.90	3.40	....	2.78	2.55	2.55	.75ff	33.50ee
Boston	18.00	27.90	....	....	....	3.13g q	2.97og	2.97og	.42g	50.50g
Chicago	18.00	27.90	....	....	....	3.17‡u	3.02‡o	3.02‡o	42.00‡bbr	50.00‡
Cincinnati	18.00	27.90	....	....	....	2.88	2.60	2.60	.55y	49.36
Cleveland	18.00	27.90	2.29pgg	2.52gg	2.62gg	2.88q	2.60o	2.60o	.43y	42.70hh
Dallas	18.25	28.65	....	4.05	....	3.50q	3.75o	4.35o	.36	58.50hh
Denver	18.50	28.40	3.29	5.15	3.04	2.78	2.55o	2.55o	.43ff	45.00
Detroit	18.00	27.90	2.35	3.25	2.50	2.88	2.60f	2.60f	.55	46.00
Kansas City	18.00	28.65	3.50	3.00ys	2.65	2.78	2.58o	2.58o	.42	61.95
Los Angeles	18.00	28.15	3.30n	4.50n	4.20n	3.10n	2.25en	l	.64ny	l
Minneapolis	18.00	29.88/28.02	....	....	....	2.88dd	2.60hidd	2.60hidd	.48idd	44.00r
Montreal	......	21.95	2.95Dff	4.05Eff	3.25Fff	4.05t	3.60tf	3.60t	1.00kt	3.60k
New York	18.00	27.90	....	....	....	2.88G	2.60Go	2.60Go	.48Gz	44.00*
Philadelphia	18.00	27.90	3.60	3.40/3.65	3.50/4.60	2.54	2.94	2.94	.37	26.00
Pittsburgh	18.00	27.90	2.68	2.85	3.15	2.88	2.72o	2.72o	.43	54.00
St. Louis	18.00	27.90	....	....	....	2.63	2.55h	2.55h	.42y	51.21
San Francisco	18.00	28.15	2.40	....	3.40	2.79	4.00aa	....	.43	.....
Seattle	18.00	28.40	3.07mcc	2.93mcc	....	3.45mocc	2.91hmcc	....	.59mcc	52.00mcc
Toronto	......	......	....	....	....	4.45	4.10	....	1.45	85.00

•‡ Delivered. • Note: Red lead in oil 50¢ higher than white lead in oil. •a Red lead prices change frequently due to pig lead price changes. •b U. S. War Dept. Spec. 3-49A. •c ASTM Spec. D266-31. •d 80% minimum ferric oxide. •e 15 lb. •f Per 432 sq. ft. •g F.o.b. yard, Roxbury. •h Per roll, 65 lb. •i Net carload lot prices; Minneapolis and vicinity. •k Per cwt. •l Not used. •m 1% discount for cash. •n F.o.b. city. •o Per 60-lb. roll. •p 6-drum. 50 gal. ea. •q Per 90-lb. roll• -r F.o.b. factory, Chicago. •s 466 Med. •t Federal tax included. •u Per 90-lb. square. •v Per ton. •w Price to large paint contractors is $1.25 less. •x Mineral surfaced. •y 55-gallon container. •z Drums. •aa Approximate cost per 100 lbs. •bb Roofers coating and cement; Price per ton. •cc LCL, truck delivery. •dd 2% cash discount. •ee Asphalt pitch in 100 lb. package. •ff 5-gal. drums. •gg F.o.b. factory. •hh Incl. freight. •D Std. Black. •E Ready-mixed. •F Over 80% ferric oxide. •* Aver. wt. approx. 425 to 550 lbs. drums. •G Freight absorbed to destination not over .35 cwt.

PLASTER, VERMICULITE AND METAL BUILDING SHEETS & TUBING

	PLASTER†		VERMICULITE†				ALUMINUM SHEETh		STAINLESS STEEL SHEET*-TYPE 302g		COPPER WATER TUBING-TYPE L 2000 ft lots per fta	
			Home Insulation pellets	Plaster aggregate	Concrete AGGREGATEl		Flatj .102″ th 36″x96″ & 48″x144″ per lbt	Corr roof .032″ th 35″x12″ per shu	20 ga 48″x96-120″ per cwthh	28 ga 36″x120″ per cwtmm		
	Neat per ton	Gauging per ton	per bag of 4 cu ft		Treated	Untreated					⅜″b	½″c
Atlanta	$29.00	$36.00	$1.45	$1.35	$1.50	....	$0.359n	$7.067n	$53.68	$61.18	$14.49f	$20.29f
Baltimore	21.50	32.00	0.95	1.15	....	$1.15	0.391	0.427r	56.25	64.25	0.1874	0.2629
Birmingham	36.00	43.00	1.55	1.55	1.75	....	0.414	8.392	55.68	65.68	0.1727	0.2430
Boston	19.90	.....	1.15	1.18	....	1.30	0.44q	36.15op	55.81dd	61.585ddff	0.1704	0.2395
Chicago	25.20	25.20	1.45	1.50	1.50/1.60	....	0.43o	8.892♯p	57.55♯ee	65.55♯ee	0.1773	0.2496
Cincinnati	21.60*•	21.60	1.75	1.75	1.85	1.75	0.400	8.34	57.60	69.30ff	0.1726	0.2430
Cleveland	26.00	40.00	1.25	1.32	1.40	....	0.369aa	7.569	58.25	63.25	20.63f	25.86f
Dallas	29.80	31.80	1.20	1.25	1.30	....	0.379	0.439r	55.00	63.00	0.1449	0.2029
Denver	24.00	24.00	1.40	1.30	....	1.50	0.437	8.89	57.32gg	65.32gg	0.1773	0.2496
Detroit	24.00	24.00	1.32	1.33	1.42	1.42	0.415	8.892	57.80	65.80	17.00foo	11.00f
Kansas City	30.00	35.00	1.20	1.30	1.40	....	0.416	9.94	60.72ee	68.72ee	18.74f	26.29f
Los Angeles	25.00	26.00	1.25ii	1.20ii	1.45ii	1.25ii	0.427	9.79	69.35	87.10	0.2252	0.2828
Minneapolis	31.00	31.00	1.30	1.60	....	1.80	0.425	7.68	58.26	71.01ff	0.1638d	0.2305d
Montreal	28.80	33.20	1.00	1.30	1.35	1.30	0.372	8.25	54.00	.....	0.29	0.350
New Orleans	35.00	37.00	1.50	1.20	1.25	1.25	0.359	0.366aabb	56.68	64.18	0.1449	0.2029
New York	23.00	29.00	1.25	1.20	1.40	1.30	0.43♯ov	8.50♯	58.42	66.42	20.16f	28.39f
Philadelphia	23/25	32.00	1.35	1.35	1.35	1.40	26.50♯wx	7.55♯	53.23♯	60.98♯	14.49f	20.29f
Pittsburgh	27.50	31.00	1.25	1.25	1.30	1.30	0.42	9.19	56.81	62.63	0.1923	0.2437
St. Louis	30.00	37.00	1.25	1.50jj	1.60jj	1.50	0.45io	8.89e	56.64kk	75.64kk	16.81fm	23.63fm
San Francisco	24.00	26.00	1.05	1.03	....	1.24	0.416	8.14cc	71.85	.....	0.1773	0.2496
Seattle	33.00	36.50	1.45	1.25k	1.65	....	0.369	7.569	64.75ee	72.75ee	0.1449	0.2029
Toronto	32.50	47.00	1.20	1.45	1.45	1.35	0.38	20.55	58.80	92.40	0.3065pp	0.3854pp

† trucklots, delivered * carload ♯ delivered •a fob city •b ½″ O.D. •c ⅝″ O.D. •d 10M ft & over •e 2-10M ft; 10M ft & up: $0.1925/ft •f per 100 ft •g 5 tons & up; cold roll, anneal & pickled; 2B finish •h 15M lb •i 3003 alloy; 1100 alloy: $0.456/lb •j 1100 & 3003 alloy, mill finish •k per bag of 3 cu ft •l treated has air entraining agent; untreated does not •m 2-10M ft •n fob plant, fr allow •o 5M lb & up •p 100 sq ft quantity •q 2M lb quantity •r per lb •t 36″ x 96;- 10.81 lb/sh; 48″ x 144″:21.7 lb/sh •u 19.31 lb/sh •v in 4M-lb skids; $0.296/lb in 1M-lb cases •w 48″ x 144″ •x 36″ x 96″ $13.25/sh •aa 16M lb & up •bb fob mill •cc 26″ x 6-12′ •dd add $0.75/cwt for boxing •ee 4 tons & up •ff 26 ga •gg add $2/cwt boxing; $0.75/cwt on skids •hh Theoretical wt for 48″ x 96″; 50.4-lb, per sh. •ii 300-bag lots •jj per 100-lb bag •kk mill shipment; add $2 per cwt for immediate del •mm Theoretical wt: 19.7-lb per sh •nn Deliv, warehouse means •oo ¼″ O.D. •pp Incl 10% sales tax

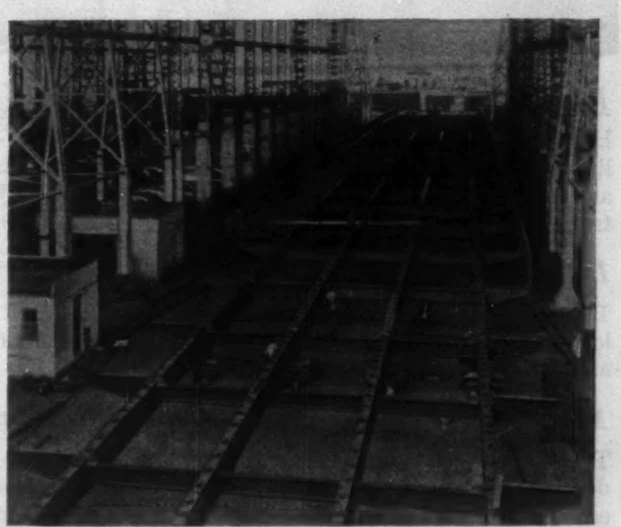
This graceful five-span structure bridging the Chena River near Fairbanks is 398 ft long and has a roadway width of 30 ft. *Owner:* Alaska Road Commission, Juneau. *General Contractor:* Boen-Sealand Constructors, Seattle. Steel was erected by Isaacson Iron Works, Seattle.

How they cut freight costs in building this Alaska bridge

This 398-ft, deck-girder bridge crosses the Chena River at a point near Fairbanks, Alaska. A glance at a map will show you that Fairbanks lies well over 460 miles from port, and the port itself is a long, long journey from Portland, Oregon, where the steelwork was to be fabricated. The Alaska Road Commission understandably preferred to see their money go into the bridge rather than into the cost of transporting it.

For this reason, Fought and Company, steel fabricators, used Mayari R wide-flange beams wherever feasible. With a yield point 50 pct higher than that of carbon structural steel, low-alloy, high-strength Mayari R could be employed in lighter sections to lower the deadweight of the bridge components, while assuring the needed strength in the finished structure. The decreased weight resulted in a significant saving in shipping costs.

Nearly every structural job carries some requirement which Mayari R can help solve. If not the cost of transportation, then perhaps unusually heavy load limits, or minimum deadweight, or long-term resistance to corrosion, impact or vibration. Our Catalog 353 contains plenty of examples of applications where these problems were involved. You can get a copy promptly through the Bethlehem office nearest you.



This is how the steelwork looked during fabricating stage, in the works of Fought and Company, Portland, Oregon, steel fabricators. Mayari R beams were used extensively to lower weight and cut shipping costs.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R makes it lighter... stronger... longer lasting

new style! new comfort! new power!

new Internationals!

New INTERNATIONAL "S-line" includes light, medium and heavy-duty models from 4,200 to 33,000 lbs. GVW, with 10 gasoline and LPG engines, every modern truck feature.

Functionally styled for practical good looks!

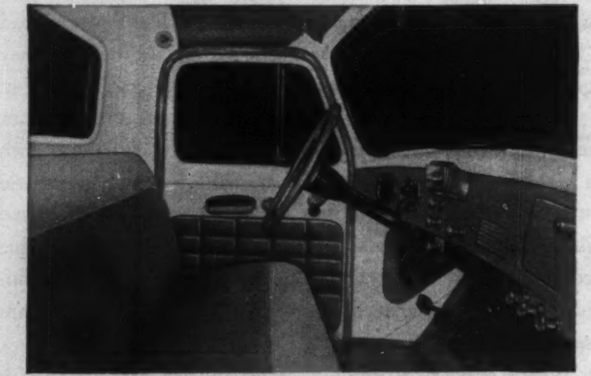
Here are the new INTERNATIONALS . . . a great new truck line from *any* point of view! Their clean-lined styling is trim and functional — designed to take the rough going of truck work without excessive repair costs.

Driver designed for real comfort!

They give you real comfort, too! They're driver-designed to let you work longer without fatigue. Loaded with performance and handling features that make hauling jobs easier.

More usable horsepower for BIG money savings!

These great INTERNATIONAL trucks offer more horsepower — develop their power for sustained operation at lower, more economical engine speeds. They're *all truck* with no passenger car engines or components asked to do a truck job. That saves you the BIG money — the over-the-years operating and maintenance money. Drive them today, at your INTERNATIONAL Dealer or Branch.



You relax in REAL comfort in Comfo-Vision cabs. Comfort-angled steering wheel. Low hood for closer view ahead. "Quiet-ride" roof lining, draft-free doors. Choice of 24 solid and optional two-tone exteriors. Optional deluxe cabs have color-keyed interior, chrome trim.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

International Harvester Builds McCORMICK® Farm Equipment and FARMALL® Tractors . . . Motor Trucks Industrial Power . . . Refrigerators and Freezers

MATERIALS AND LABOR PRICES

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ½"	GYPSUM PLASTER BOARD tapered edge per Msq ft ⅜"	GYPSUM BOARD LATH plain or perf per Msq ft ⅜" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	FIBER BOARD SHEATHING asph impreg & coat per Msq ft 25/32" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft ½"	MINERAL WOOL INSULATION† loose, per 40-lb bag a	MINERAL WOOL INSULATION† 3" batts per M sf	GLASS FIBER INSULATION† loose, per 40-lb bag a	GLASS FIBER INSULATION† 3" batts per M sf	ALUMINUM FOIL 60# Kraft 1 side foil per roll of 250 s. f.	ALUMINUM FOIL Expansible Blanket 2 layers foil per Msq.ft.
Atlanta	$75.00	$65.00	$45.00	$75.00	$75.00	$125.00	$75.00	$1.08	$75.00	$1.45b	$85.00	.....	.....
Baltimore	$49.25f	43.50f	31.30f	53.00f	65.00f	108.50f	69.00f	1.30	66.50	1.60	45.00	$4.00g	$33.50
Birmingham	67.00	56.00	46.75	75.00	73.50	124.00	72.50	1.32	70.00	1.60	80.00	3.87g	.....
Boston	46.50m	41.00m	31.50m	48.00m	64.00m	109.00m	79.00hn	1.45	75.00	1.40	56.00	5.80	54.50
Chicago	67.00	50.00	41.00	57.00	80.00	117.00	76.00	1.60	82/84	....	60/62bb	5.25	....
Cincinnati	46.40w	41.60w	30.80w	45.81w	65.00w	110.00w	65.00w	.....	61.00	1.25	75.00	2.81	50.00w
Cleveland	60.00	60.00	40.00	60.00	70.00	111.00	70.00	1.35/1.50	75.00	2.20	82.00	7.76dj	.....
Dallas	55.00	52.50	40.00	62.50	73.50	122.50	70.00	1.90	65.00	1.35	65.83	4.25	.....
Denver	60.00	52.50	40.00	60.00	72.90	123.00	71.90	....	71.00i	1.30	50.00	11.00r	21.00
Detroit	55.00	48.50	35.75	54.00	56.50	95.00	56.00	.....	.....	1.95b	76.00	....	.....
Kansas City	65.00	55.00	40.00	65.00	72.00	120.00	75.00	1.40	80.00	1.40	80.00	15.45dt	25.75
Los Angeles	57.50	50.00	0.31z	57.50	71.87	121.25	80.00	....	83.00	1.35s	64.00	17.00o	25.40
Minneapolis	72.00	63.00	0.40z	65.00	70.00	114.00	70.00	1.30	78.00	1.30	78.00	6.50	....
Montreal	60.00	52.00	39.00	53.00	60.00	....	62.00	1.00	62 00	1.00	62.00	20.00s	50.00
New Orleans	65.00	50.00	45.00	65.00	65.00	100/115	70.00	1.95	79 00	....	.....	15.66u	.....
New York	50.00	44.50	34.00	51.00	69.00	109.00	70.50	1.55	69.00	1.90	72.00l	5.20	48.80cc
Philadelphia	50.00	48.00	34.00	48.50	67.50	105.00	49.20	....	63/70	....	70/75	5.50/6	34.50/44.50
Pittsburgh	68.00	57.00	42.50	70.00	70.00	108.00	65.00	1.90	72.00	1.90	72.00	4.10	.....
St. Louis	58.00	52.50	39.00	58.50	65/72.50	115/120	75.00	1.70	80.00	1.30	69.00	5.50	.....
San Francisco	49.00c	42.75	0.33z	53.00k	58.00	94.00	56.00	1.60	66.50	1.55	66.50	4.82l	52.50
Seattle	57.50	50.50	40.00	59.00	71.40	120.35	70.20	1.50y	81.00	1.65s	62.00aa	4.25g	.....
Toronto	61.00	50.00	40.00	64.50	75.00	....	.....	0.90	47.00	....	51.00	14.40o	39.00

•a for hard packing •b per 30# bag •c carloads •d 40# kraft paper •f full trailer loads •g 80# kraft paper backing •h LCL •i flameproof $75.00 | 133 lin ft; per 100 roll
•k plain core; asph core $56/M sq ft •l 2-in: $52/M sq ft •m 10 ton quantities •n distributor's siding •o per Msf roll •p per sf •r per cwt •s per 35# bag •t per M sq ft
•u honeycomb, 1¼-in •w fob city •x per sq. yd. •y 26# bag •z 32# bag •aa fob warehouse •bb 2" •cc in 250 sf rolls, of 16", 20", or 24" width.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Brick-layers	Car-penters	Struct. Iron Workers	Hoisting Engineers	Plas-terers	Electrical Workers	Steam-fitters	Common Labor Building	Common Labor Heavy Const.
Atlanta	$3.25	$2.60	$2.95	$2.70	$2.875	$3.00	$3.15d	$1.38	$1.38
Baltimore	3.20d	2.75	3.325t	2.55/2.80Q	3.075t	3.075	3.075t	1.675t	1.675t
Birmingham	3.50	2.60	3.00k	2.42	2.82	3.075k	3.125k	1.375	1.475
Boston	3.35v	2.925k	3.475k	3.40	3.45I	3.25R	3.30d	2.22Y	2.22Y
Chicago	3.625k	3.375v	3.50k	3.225m	3.625y	3.53f	3.44aa	2.575k	2.575k
Cincinnati	3.40	3.15	3.275k	2.925/3.175	3.225	3.41N	3.445Z	2.20	2.10
Cleveland	3.45k	3.40	3.40k	3.40	3.40	3.425	3.40d	2.65	2.65
Dallas	3.625	2.875	2.95	2.95b	3.437	3.00	3.185bb	1.50	1.50
Denver	3.50	2.975	2.975t	2.83	3.375t	3.00	3.20D	1.925	1.925
Detroit	3.58ve	3.324q	3.475P	3.30vz	3.49vl	3.655H	3.37k	2.55vz	2.55vz
Kansas City	3.625	2.85	3.00	3.045	3.325	3.18O	3.225k	2.105	2.13
Los Angeles	3.60	3.00d	3.325b	2.79d	3.75S	3.25	3.44d	2.275d	2.275d
Minneapolis	3.325	2.90	3.07	2.85	3.18Gv	3.29n	3.075d	2.15	2.15
New Orleans	3.175	2.60	2.975b	2.80	2.80	3.10k	3.10v	1.475	1.475
New York	4.15br	3.73bJ	4.075p	3.99J	4.35A	3.66aF	3.978bL	2.592V	2.592V
Philadelphia	3.92i	3.30	3.73jM	3.07/3.82v	3.65C	3.80ur	3.615g	2.025	2.325
Pittsburgh	3.725k	3.275k	3.375k	3.425k	3.575k	3.50	3.50k	2.175k	2.08d
St. Louis	3.625c	3.225h	3.225k	3.225	3.50k	3.60c	3.50E	2.275k	2.275k
San Francisco	3.75v	3.16v	3.35s	2.96s	3.66s	3.35U	3.56K	2.275s	2.275s
Seattle	3.50d	2.76d	3.07d	3.00d	3.25d	3.135X	3.31T	2.35d	2.35d
Montreal*†	2.10	1.90	2.00	1.80	2.12	2.10	2.12	1.50	1.50
Toronto**	2.558	2.392	2.39	2.45	2.496	2.60	2.444	1.40	1.40

* Cost of living bonus now included in basic wage. † Plus 8% fringe benefits ** Incl. 4% vacation fund. •a 6 hr. day. •b 7 hr. day. •c Incl. 3% vac. stamp fund plus 7½¢ WF for bricklayers; 4% VF for electricians plus 8¢ WF, 1% PF. •d Incl. 10¢ H&WF. •e Incl. 10¢ VF. •f Incl. 6% WF. •g Incl. 11½¢ WF. •h $2.725 homes & housing plus 7½¢ WF. •i Incl. 17¢ WF. •j Incl. 10½¢ hr. WF. •k Incl. 7½¢ hr. WF. •l Incl. 4% VF •m Incl. 5¢ hr. WF. •n Incl. 8¢ H&WF, 6% VF, 1% PF. •o Incl. 10¢ PF, 7¢ WF. •p Incl. 3% WF, 3% PF. •q Incl. 10¢ ins; 4% vac. and holiday pay. •r Incl. 4% WF and 20¢ PF. •s Incl. 5% W&PF, 4% VF, 1% NC, 6 PH. •t Incl. 7½¢ H&WF. •u Incl. 1½% PF. •v Incl. 10¢ WF. •w Negotiating. •x 5¢ VP. •y Incl. 22½¢ WF. •z Incl. 7½¢ IF, 5¢ H&WF. •A Incl. 15¢ WF, 15¢ PF, 20¢ B.F. •B Incl. 3% WF. •C Incl. 15¢ WF. •D Incl. 10¢ H& WF, 5¢ organ. •E Incl. 6% WF. plus travel pay per day. •F Plus $4 per day Annuity contrib. •G Incl. 3¢ Prom. •H Incl. 7¢ WF, 6% VF. •I Incl. 15¢ H&WF, 5¢ for Advtg. •J Incl. 5% WF, 6 PH. •K Incl. 11¢ WF, 12½¢ VF, 10¢ PF. •L Incl. 3% WF, 3% PF, 2% VF, 1% EF. •1 M Incl. 7½¢ PF. •N Incl. 1% WF. •O Incl. 10¢ WF, 1% PF. •P Incl. 10¢ hosp. ins.; 5¢ vac. • Q 1 drum, 2 drums $ 3.25/3.40. • R Incl. 12¢ WF and 1¢ apprentice. •S Incl. 12½¢ H and WF. •T Incl. 21¢ H, W & VF. •U Incl. 7½¢ WF, 4% VF. •V Incl. 5% WF, 3% PF. •W Incl. 2% F. •X Incl. 6¢ VF, & 7½¢ H & WF. •Y Incl. 7¢ H & WF. •Z Incl. 9½¢ WF. •aa Incl. 7¢ WF, 15¢ PF. •bb Incl 8¢ WF.

MEXICO CITY PRICES

In Pesos, F.o.b. City		Aug. '55	Sept. '55
Common Wages—Building (8 hr. day) (Peons)	av. per hr.	1.19	1.19
Common Wages—Heavy Const. (8 hr. day) (Peons)	av. per hr.	1.19	1.19
Skilled Labor Wages			
Carpenters (8 hr. day) 1 cl.	av. per hr.	2.25	2.25
Bricklayers (8 hr. day) 1 cl.	av. per hr.	2.25	2.25
Struct. Iron Workers (8 hr. day) .....Remachadores.	av. per hr.	1.37*	1.37*
Struct. Steel Shapes			
3"-15" x 12 meters	per metric ton	1490.00	1564.50
Reinf. Steel, Corr. Rods			
⅜" x 11 meters	per ton	1490.00	1564.50
½" x 11 meters	per ton	1490.00	1564.50
⅝" x 11 meters	per ton	1490.00	1564.50
¾" x 11 meters	per ton	1490.00	1564.50
⅞" x 11 meters	per ton	1490.00	1564.50
1" x 11 meters	per ton	1490.00	1564.50
Gravel truck load of 3⅓ cu. meters			
Blue Gravel	per tr. load	70.00	70.00
Rose Gravel	per tr. load	65.00	65.00
Cement, Std. Port. (Tolteca)	per ton	185.00	185.00
Lumber			
3rd Class Pine	per M ft.	1400.00	1400.00
1st Class Pine	per M ft.	2000.00	2000.00
2nd Class Pine	per M ft.	1800.00	1800.00

* 1st & 2nd floors. Aver rate 4.38

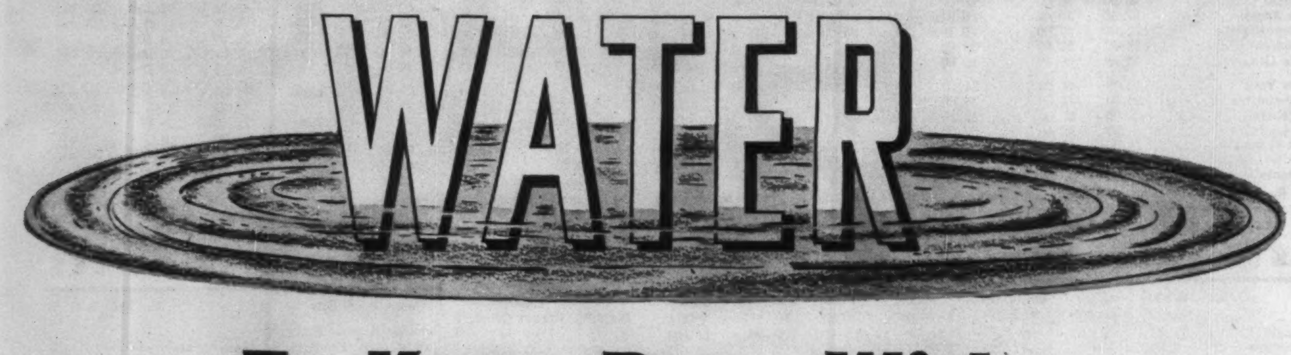
ENR Skilled Average (Bricklayers, Carpenters Iron workers): $3.286. ENR Common Average $2.093

EQUIPMENT OPERATOR WAGE RATES

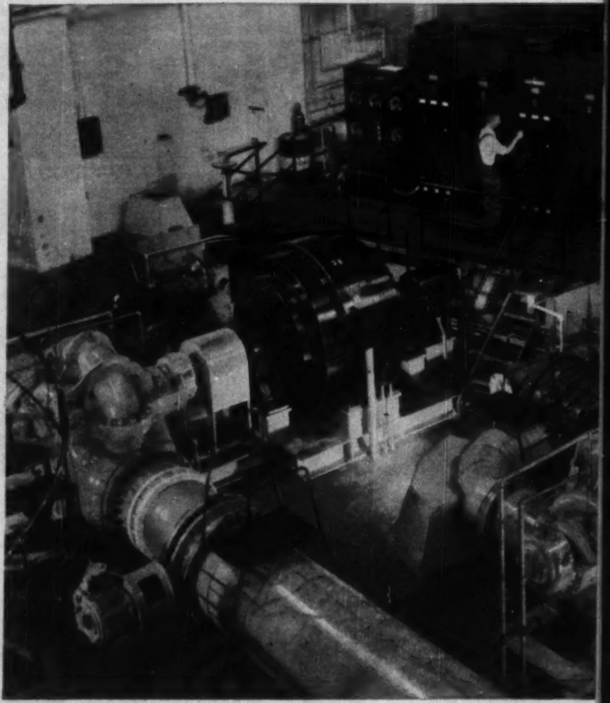
	Truck drivers 1½ T	Truck drivers −4 cy Dump	Truck drivers +4 cy	Tractor Operators incl bulldozers 34-49 hp	Tractor Operators incl bulldozers 70–100 hp	Tractor Operators incl bulldozers 100 & over	Tractor scraper 15–16 cy	Power cranes & shovels ½ cy	Power cranes & shovels ¾ cy	Motor grader oper	Air comp oper	Air tool oper
Atlanta	$1.50pp	.....	.....	$2.425	$2.425	$2.425	$2.425	$2.95	$2.95	$2.425	$2.20	$1.60
Baltimore	1.675u	1.825u	1.925u	2.85/3.00b	2.85/3.00b	2.85/3.00b	285/3.00b	3.25/3.40b	3.25/3.40b	2.85/3.00b	2.85/3.00b	2.25
Birmingham	1.59	1.85ff	1.92gg	2.56	2.56	2.56	2.70	2.70	2.70	2.61	2.285	1.625
Boston	1.945c	.....	.....	3.025d	3.025d	3.025d	3.025d	3.40	3.40	3.40	2.555	2.22e
Chicago	2.12fii	.....	.....	2.90ag	3.05ah	3.10ai	2.90a	3.50a	3.50a	3.00a	3.00a	....
Cincinnati	2.10**	2.20**	2.30**	2.925	2.925	2.925	2.925	3.175	3.175	3.175	3.175	3.175
Cleveland	2.42m	2.42m	2.42m	3.15	3.15	3.15	3.15	3.40	3.40	3.15k	3.025	3.025
Dallas	1.50	1.50	1.50	1.50/2.625l	1.50/2.625l	1.50/2.625l	1.50/2.625l	1.50/2.625l	1.60/2.625l	1.60/2.625l	1.50/2.00l	1.50/1.55l
Denver	2.05	2.05	2.15	2.66	2.66	2.66	2.66	2.83	2.83	2.66	2.66	2.275
Detroit	2.35**	2.35**	2.35**	3.30m	3.30m	3.30m	3.30m	3.30m	3.30m	3.30m	3.025m	2.68m
Kansas City	2.065n	2.065o	2.14p	2.25	2.80q	2.80q	2.80r	3.045	3.045	2.66	2.80t	2.19
Los Angeles	2.38u	2.38u	2.41u	2.87m	2.87m	2.87m	3.28m	3.10m	3.10m	3.01m	2.59m	2.485u
Minneapolis	2.15	2.15v	2.30w	2.53	2.75q	2.97x	2.75	2.97y	3.23z	2.53	2.42	2.25
New Orleans	1.575	1.575	1.575	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.15	1.575
New York	2.12¾aa	2.52bb	2.52bb	3.33cc	3.23cc	3.33cc	3.465cc	4.25cc	4.25cc	3.465cc	3.465cc	2.94cc
Philadelphia	1.90/2.10u	1.90/2.10u	1.90/2.10u	3.17/3.92m	3.17/3.92m	3.17/3.92m	3.17/3.92m	3.17/3.92m	3.17/3.92m	3.17/3.92m	2.99m	2.15m
Pittsburgh	2.275u	2.275u	2.275u	2.95u	3.275u	3.325u	3.325u	3.425u	3.425u	3.325u	3.325u	2.275u
St. Louis	2.275unn	.....	.....	3.225kk	3.225kk	3.225kk	3.225kk	3.225kk	3.225kk	3.225kk	2.675kk	2.2675kk
San Francisco	2.30u	2.30u	2.315u	3.07m	3.07m	3.07m	3.07m	3.40m	3.40m	3.23m	2.68m	2.40m
Seattle	2.60nu	2.60ndd	2.80nee	2.75m	2.95m	2.95m	2.95m	3.30m	3.30m	3.05m	2.75m	2.62m
Montreal ll	1.30	1.30	1.30	1.73	1.73	1.73	1.73	1.99	1.99	1.73	1.80	1.60
Toronto	1.51ii	1.51ii	1.72ii	1.98ii	1.98ii	1.98ii	1.98ii	2.45ii	2.45ii	....	2.13ii	2.13ii

•a Incl 5¢/hr HWF •b lower rates, straight time, other broken •c 2-axle; 10-wheel $2.00; Euclid $2.20 •d Intermediate •e bldg constr; highway $2.145 •f less than 2-t •g blade •h scoop, bldg •i scoop, road •j plus $2 pd by employer for hosp. death benefits to family •k bldg constr; steel constr $3.40 •l higher rates are union, other taken from min wage scale approved by County Commissioners Court •m incl 10¢ H&WF •n flatbed •o under 10 cy •p over 10 cy •q over 50 hp •r blade grader •s form and subgrade •t single •u incl 7½¢ HWF •v up to 6 cy •w 6–8 cy •x cat oper •y up to 3½ cy •z 3½ cy & over •aa plus approx $5.30 per wk W&PF •bb incl 3% WF, 2% PF, 11 PH •cc incl 5% WF •dd up to 5 cy •ee 5 cy & over •ff over 1½ T but not incl 3 •gg over 3 but not incl 5 tons •hh excavating •ii incl 4% VP •jj includes 12¢ H, W & PF •kk 7½¢ WF included in base pay •ll Plus 8% fringe benefits •nn 8 cy or less; 8–16 cy $2.875; 16–25 cy $3.125 •oo Plus $2.25/wk WF •pp 2-5 T $1.70.

ALLIS-CHALMERS Helps Milwaukee



To Keep Pace With Population-Business Growth of Wisconsin's Largest City



In hustling, bustling Milwaukee, water is used at the rate of 175 gallons per day per person. Within the 100-sq-mile metropolitan area of Milwaukee, there are nearly a million people . . . and 2000 thriving manufacturing firms, including world leaders in the production of heavy industrial machinery, beer, motorcycles, tractors, diesel and gasoline engines . . . all using water in increasing amounts.

Milwaukee's water is obtained from Lake Michigan — through an intake over a mile out and 67 feet deep. Consumption climbed from 22 billion gallons in 1924 to 48 billion in 1954. A record month's high — 6¼ billion gallons — was pumped in August 1955.

Allis-Chalmers equipment now operating in Milwaukee's water system includes large vertical pumping engines — dating back as far as 1890 — at the North Point station, and steam and motor-driven units, electrical equipment and valves at the Riverside station, filtration plant and booster stations. In 1955, as part of a continuing modernization and expansion program, two A-C 30-mgd, motor-driven pumps, with controls, substation and butterfly valves, were put into service at the Riverside station.

When YOUR CITY plans expansion or modernization, do as other progressive communities are doing — call the nearest A-C office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

A-4856

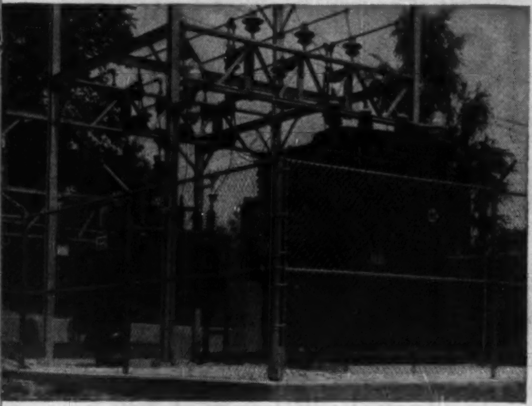
Builders of World's Widest Range of Public Works Equipment

Pumps; motors, Texrope drives, control; switchgear, substations, transformers; butterfly valves; steam turbine-generator units, condensers, hydraulic turbines and generators, engine-generator units; blowers, compressors, vacuum pumps; dryers, screens, mills, sifters; tractors, graders, scrapers, motor wagons, power units.

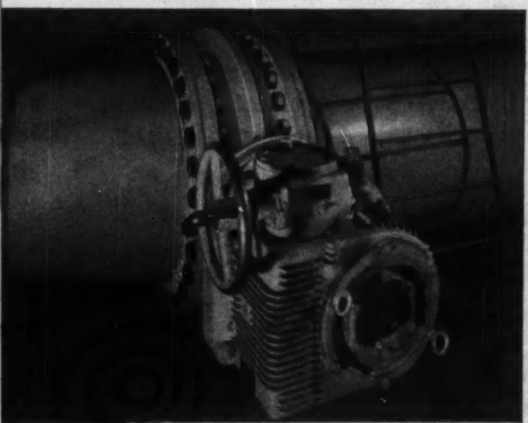
ALLIS-

Milwaukee Journal Photo

Modernize and Expand Water Works



Allis-Chalmers outdoor substation protects and controls the electrical power supply for Milwaukee's Riverside pumping station.



Close-up showing one of several of the latest Allis-Chalmers butterfly valves installed at the Riverside station. A-C builds many designs of valves, including units conforming to American Water Works Standards.

Two new Allis-Chalmers 30-mgd pumps and their 2000-hp synchronous motors and controls were fitted into space formerly occupied by one 30-year-old, 15-mgd vertical pumping engine.

View of Riverside station installation dramatizes progress in pump design in the past 30 years. Towering pumping engine in background was record setter in 1924 and is still going strong. But at best it pumps only two-thirds of the water handled by compact new A-C pump in foreground.

Texrope is an Allis-Chalmers trademark.

CHALMERS

A-C
ALLIS-CHALMERS

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.
J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

▲ **Conn., West Hartford**—SCHOOL—BA 10/9—Town, Mrs. Gordon L. Spencer, secy. School Bldg. Comn., Town Hall, elementary school, Braeburn Rd. $1,248,000. Plans deposit $50. Extended date. Louis J. Drakos, 967 Farmington Ave., archt. CD 8/31.

▲ **Conn., North Haven**—MANUFACTURING, etc.—BA 10/11—Pratt & Whitney Aircraft Div., United Aircraft Corp., 400 Main St., East Hartford, 681x723 ft. manufacturing and office, Washington Ave. $5,000,000. F. A. Fairbrother, George H. Miehls, 345 New Center Bldg., Detroit, Mich., archts. Albert Kahn Associated Architects & Engineers, Inc., New Center Bldg., Detroit, Mich., assoc. archt.

BUILDINGS—LB & CA

▲ **White Constr. Co.**, 376 Boylston St., Boston, Mass. LB **$1,988,151.** HIGH SCHOOL, Pond St., HA[illegible]N, MASS. Town, South Main St., Sharon, Mass. Bids Sept. 22. CD 8/17.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲† **New York**—BA About 12/15—U. S. Eng., Engineer Park, Niagara and Bridge Sts., Buffalo, Zone 7, Robinson Bay Lock, St. Lawrence Seaway, St. Lawrence River, 860 ft. lock in length from pintle to pintle and 80 ft. width, gravity type walls constructed of mass concrete, approx. 3½ mi. N.-N. E. of Massena, St. Lawrence County, for St. Lawrence Seaway Development Corp., CIV. ENG. 30-023-56-17. Plans deposit $25. CD 9/9/54.

BUILDINGS—BA

▲ **N. J., Camden**—SCHOOL—BA 10/13—Bd. Educ., City Hall, Junior High School, 7 and Erie Sts., $2,250,000. Edwards & Green, 17-19 S. 5 St., archts. CD 1/8/53.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—Bureau & Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

N. Y.—**Yonkers Contg. Co.**, 959 Midland Ave., Yonkers, N. Y. LB **$2,995,564.** 4.48 mi. portion Erie section Thruway, starting Cain Rd. 1 mi. south Angola northeast on east side of Rte. 20 to Evans Center-Eden Rd., Erie Co.; LB **$2,792,824.** constr. 4.86 mi. portion Erie Section Thruway starting west Foret Rd., southwest Brocton, exten. northeast between Rtes. 5 and 20 to Lake Ave., near Brocton, Chautauqua Co.;

N. Y.—**De Lillo Constr. Co., Inc.**, 71-51 51 Ave., Woodside, L. I., N. Y. LB **$724,748.** 1.32 mi. section Peninsula Blvd. from Lexington St. Northward along Western edge Rockville Centre between Hempstead Reservoir and North Village Ave. to Southern State Parkway, Nassau Co.;

N. Y.—**Callanan Road Imprvt. Co.**, South Bethlehem, N. Y. LB **$151,349.** grading, paving, in preparation for constr. thruway maintenance bldgs. at Albany, Albany Co., Catskill, Greene Co. and Kingston, Ulster Co.;

N. Y.—**Anchore Post Fence Div., Anchor Post Products, Inc.**, 32 Buckingham Dr., Albany, N. Y. LB **$98,096.** chain link fence from New York City line to East approach thruway's Hudson River Bridge between Tarrytown and South Nyack, Westchester Co. Bids Sept. 22. CD 8/29.

▲ **Jandous Electric Constr. Corp. & Lord Electric Co., Inc.**, 210 E. 40 St., New York 17, N. Y. LB **$2,196,000,** installing signal equip. for Third Ave. line, 149 St. to 219 St., Bronx Boro. Contr. S 68, NEW YORK. New York Transit Auth., 370 Jay St., Brooklyn 1, N. Y. Bids Sept. 23. CD 8/2.

▲ **Hendrickson Brothers, Inc.**, 63 N. Central Ave., Valley Stream, N. Y., CA **$3,954,060,** lateral sewers vicinity of Valley Stream and Malverne, town of Hempstead, sewage collection, Dist. No. 2-VS, Contr. No. 1002-2-VS-4, MINEOLA, N. Y. Bd. Supervs. Nassau Co., Old County Court House, Mineola, N. Y. CD 9/8, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 N. Office Bldg., Harrisburg,

Pa.—**M & S Constr. Co., Inc.**, 1558 Electric Ave., East Pittsburgh, Pa. CA **$1,477,298.** rein.-con. pavement 24 to 36 ft. wide. two concrete arches, divided hy., rein.-con. bridge and I-beam bridge 708. mi. between Johnsonburg and Ridgeway, T. R. U. S. 219, Elk Co.;

Pa.—**Fred W. Ewing, Inc.**, 405 W. Main St., Corry, Pa. CA **$559,162.** wid'n., surf., bit. surf. 22 ft. width, exten. 6 structures, 7.4 mi., from Pittsfield northwesterly, U. S. 6, Warren Co.;

Pa.—**J. Paul Laubach**, P. O. Box 68, Benton, Pa. CA **$665,111.** wid'n., surf. 22 ft. in width, exten. several structures, bridges, constr. I-beam bridge and two rein.-con. bridges 6.08 mi. between Gillett and Columbia Cross Rds., T.R. 14, Bradford Co. Grand total $2,701,571. CD 9/14, under LB.

BUILDINGS—LB & CA

▲ **Briarcliff Meadows Homes**, c/o Ralph H. Segal, archt., 36 E. 40 St., New York 17, N. Y. Owner Builds. **$3,000,000.** 85 HOUSES on tract on Pleasantville Rd. near Route 9A, BRIARCLIFF MANOR, N. Y.

▲ **Sunset Ridge Homes**, c/o Strathmore Agency, East Jericho Turnpike, Huntington, N. Y. Owner Builds. **$3,000,000.** 350 HOUSES on tract on Indian Head Rd. north of Jericho Turnpike, KINGS PARK, N. Y.

▲ **200 E. 57 St. Corp.**, 1 E. 57 St., New York 22, N. Y. Separate Contracts. **$1,518,000.** 18 story APARTMENT, 200-208 E. 57 St., NEW YORK, N. Y. [illegible] 5/10.

▲ **Walter Kidde Con[illegible]tors**, 140 Cedar St., New York 6, [illegible] Y., C[illegible]00,000-$6,000,000. design and co[illegible] MFG. [illegible]NT [illegible]5 acre tract between [illegible] 1 and [illegible]sylvania R.R., near NEW B[illegible] [illegible]. J. Johnson & Johnson, 1940 George St., [illegible]ick, N. J.

▲ **Upper M[illegible]clair Estates**, c/o Herman Neumann, archts., 25[illegible] [illegible]th Ave., New York 1, N. Y., Owner Builds, **$2,5[illegible],000.** 51 HOUSES on tract on Club Road near Grove St., UPPER MONTCLAIR, N. J.

▲ **Joseph Barness & Son, and Morris Kravitz**, 225 S. 15 St., Phila., Pa., Separate Contracts, $5,000,000, SHOPPING CENTER, BRANCH BANK, MEDICAL CENTER, OFFICE AREA BLDG., parking, DOYLESTOWN, PA. George W. Neff, 1520 Locust St., Phila., Pa., archt.

▲ **Richard G. Kelly**, 6844 Market St., Upper Darby, Pa., Separate Contracts, **$1,500,000,** RESIDENTIAL DEVELOPMENT, Pennel Rd. in Aston Twps., MEDIA, PA. Erling Wenge, McClatchy Bld., Upper Darby, Pa., archt.

▲ **Koppers Co., Inc.**, Koppers Bldg., Pittsburgh 19, Pa. CA Total Est. **$15,000,000.** 19 oven COKE BATTERY, auxiliary equip. primary cooler, final cooler, coke pusher and handling equip. and electrostatic precipitator, MONESSEN, PA. Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.

▲† **Joseph B. Bahen Constr. Co., Inc.**, 418 Randolph St. N.W., Wash., D. C., CA, **$3,950,000.** PRE-CLINICAL MEDICAL BLDG., Howard University, WASH., D. C. General Services Admin., P. Bldg. Service, General Services Bldg., 19 and F Sts. N.W., Wash. 25, D. C. Bids Aug. 23, awarded Sept. 22. CD 8/25, under LB.

▲ **Alfred J. Vilone**, 2213 Concord Ave., Fairfax, Wilmington, Del., Separate Contracts, **$4,000,000,** RESIDENTIAL DEVELOPMENT, Maxwell Farm, NEWARK, DEL.

SOUTH

HEAVY CONSTRUCTION—LB & CA

▲ **FLORIDA**—State Road Dpt., Tallahassee,

Cleary Bros. Constr Co., Box 6815, West Palm Beach, Fla., LB, **$2,152,761.** (1) Structures A and C each consisting of 36 ft. concrete approach spans,, double leaf bascule span and one steel concrete flanking span at each end of bascule span (2) Structures B and D consisting of 36 ft. concrete spans, (3) embankment (4) toll facilities 5,260 lin. ft. Road A-1A, over St. Lucie and Indian Rivers, Job 8904-175, Martin Co. Bids Sept. 20. CD 8/30.

▲ **FLORIDA**—State Road Dpt., Tallahassee,

R. H. Wright & Son, 1050 N. E. 5 Terrace, Fort Lauderdale, Fla., CA **$1,450,550.** stab. roa[illegible]d, rock base with surf. and b. conc. surf. course, storm sewers, curb, gutter, sidewalk 2.5/1 mi. State Road 25-A, U-019-1 (2), Job 8725-250, Dade Co. Bids Aug. 30. CD 9/2, under LB.

MIDDLE WEST

BUILDINGS—LB & CA

▲ **Paugh & Brown, Inc.**, 6007 Euclid Ave., Cleveland, O. CA Est. **$1,500,000.** enlarging Lee-Harvard SHOPPING CENTER to 50 stores, first unit 20,000 ft. supermarket, CLEVELAND, O. Selected Stores, Inc., B. L. Boykin, pres., National City Bank Bldg., Cleveland 14, O. Weinberg & Teare, Citizens Bldg., Cleveland, O., archts. Awarded Sept. 20.

▲ **McCarthy Bros. Constr. Co.**, 4903 Delmar Blvd. St. Louis 8, Mo., LB **$1,922,945.** general contract 1, 2, 3 and 4 story, 100-bed HOSPITAL, CHAPEL, NURSES HOME, BOILER HOUSE, etc. CENTRALIA, ILL. St. Mary's Hospital, Centralia, Ill. Bids Sept. 15, CD 8/30;

Fowler Plumbing & Heating Co., 217 E. 2 St., Centralia, Ill., LB **$981,900** (mechanical work).

▲ **Hoeppner-Bartlett Co.**, 631 E. Madison St., Eau Claire, Wis., CA, **$1,693,700.** general contract Senior HIGH SCHOOL, EAU CLAIRE, WIS. Bd. Educ., 118 Mappa St., Eau Claire, Wis. Bids Aug. 17. CD 8/23, under LB.

WEST OF MISSISSIPPI

BUILDINGS—LB & CA

▲ **R. F. Ball—Southwest Ball Constr. Co.**, 1430 E. Houston St., Box 1057, San Antonio, Tex., CA, **$4,748,922.** SENIOR HIGH SCHOOL, CEDAR RAPIDS, IOWA. Independent School Dist., 346 2 Ave. S. W., Cedar Rapids, Iowa. Bids Aug. 18. CD 8/26, under LB.

▲ **MacDonald Engineering Co.**, 22 W. Madison St., Chicago, Ill. CA Total est. **$2,000,000.** design and construct expansion of PLANT to double capacity, SUGAR CREEK, MO. Missouri Portland Cement Co., 3615 Olive St., St. Louis, Mo.

▲ **Allis-Chaimers Mfg. Co.**, 1126 S. 70 St., Milwaukee, Wis., CA Est. **$2,000,000.** design and construct CEMENT MILL addn. and store facilities, ADA, OKLA. Ideal Cement Co., Denver National Bank Bldg., Denver, Colo. CD 6/6.

FAR WEST

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., P. Wks. Bldg., Sacramento,

Stolte, Inc., Gallagher & Burk, Inc., 8451 San Leandro St., Oakland, Calif., LB, **$2,638,616,** est. $3,000,000 (7 bidders) grading, paving 2.8 mi. Sign Route 24 between Oakland Blvd. and 0.3 mi. north of Monument in Walnut Creek and constr. bridges, Contra Costa Co. Bids Sept. 21. CD 8/29.

BUILDINGS—LB & CA

▲ **Bechtel Corp.**, 3380 Wilshire Blvd., Los Angeles, Calif., CA **$4,000,000.** design and construct 400,000 sq. ft. PLANT addn. to mfg. styrofoam, TORRANCE, CALIF. Dow Chemical Co., Midland, Mich. CD 11/28/52.

CANADA

BUILDINGS—SLC

▲ **Que., Montreal** — SCHOOL — Les Rev. Soeurs, Ste. Anne, 1950 Provost St., Lachine, soon lets general contract 4 and 5 story, bsmnt., H-shaped, rein-con., stone, brick, "Cardinal Leger" normal school. $3,000,000. Larose & Larose, 8 Roselawn Cres., Mount Royal, archts. Brouellet & Carmle, 3600 Barclay Ave., engrs.

(Continued on page 86)

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings, $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listings)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

How a 5½ yard shovel, spotted on narrow benches, digs and trims a 284′ deep highway cut

Manitowoc 4500 excavates 600 yards per hour for Bruns Coal Company of Zanesville, Ohio, on highway widening job at Steubenville, Ohio

The Manitowoc Model 4500 will move most of nine hundred thousand yards of material to be excavated during the widening and modernization of 1.823 miles of Ohio State Highway #7 . . . Jefferson County, Ohio. Bruns Coal Company is working their 5½ Yd. rig two 8-hour shifts per day, digging through alternate layers of slate rock, coal seams, slate clay, flint clay and boulders. Blasting ahead of the machine cannot be uniform because of the layered quality of the soil, yet the Manitowoc digs as much as 600 yards per hour.

Bruns uses six 15 Yd. Euclid hauling units moving spoil from the big cut. The narrow benches are so cramped that the shovel must swing out over the lip of the cut when loading. The Manitowoc has a ground bearing pressure of only 9.6 pounds per square inch . . . (less than most one-yard machines)— and is exceptionally compact for a big machine (tailswing radius 19′4″). These factors plus the elevated pilot house (operator's eye level — 15′) warrant record yardages without interruption of highway traffic directly below.

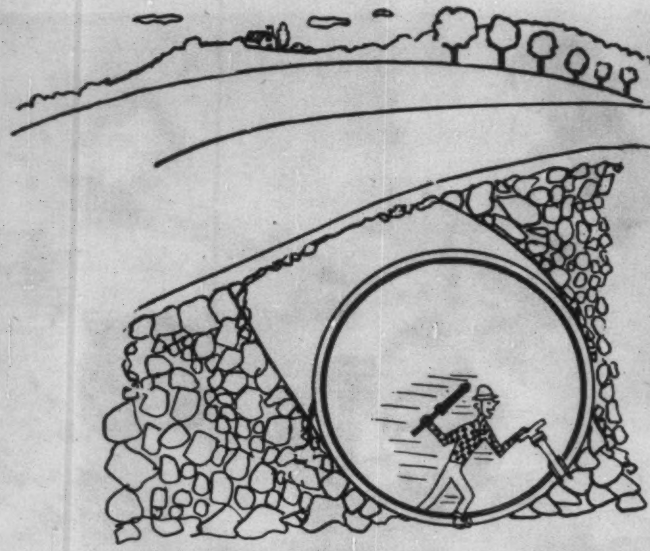
Another Manitowoc feature, the tubular dipper stick, has proven its worth in this excavation where the dipper encounters boulder, coal, slate, and clay during one digging cycle. Twisting, uneven digging forces only dip the dipper slightly and transmit no strain to the boom or shipper shaft, yet lift of the hoist rope maintains an upright dipper position and digging shocks are absorbed without the damage which might necessitate excessive maintenance in any other rig.

Besides the drill rig and hauling units, the Manitowoc is the only other machine on this cut. *Controlled Power* . . . Single diesel engine with a torque converter power take-off gives ample flexible power and speed. 52″ drum brakes and 49″ clutches, are air operated for the smooth, precise control necessary to cut, trim and finish this 284′ deep 1-to-1 slope!

Modern highway construction hinges on the ability and capacity of larger, more efficient equipment. More and more contractors are using Manitowoc Model 4500's for roadwork because of record capacity and extreme mobility. Bid your next job on the basis of a Manitowoc.

Manitowoc Engineering Corp., Manitowoc, Wis.

. . . working in close quarters, Manitowoc hangs over the highway, where traffic continues without stop.



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The Atlantic Pneumatic Pipe Driver is fast! No delay in coupling additional lengths of pipe—specially designed recess in driving head does not burr pipe. Universal joint action between driving head and shank simplifies driving in small spaces. Wide size range. Fits standard pneumatic pavement breakers. Send for Booklet 4.

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Since 1918 . . . Always First with the Finest!
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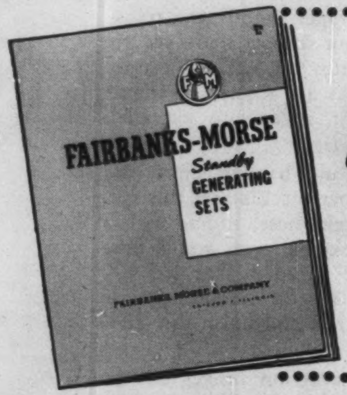

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Business name..
Your name..
Address..
City..............................Zone..........State..........................

(Continued from page 84)

HEAVY CONSTRUCTION—LB & CA

▲ **McNamara Constr. Co. Ltd.**, 42 Industrial St., Toronto, Ont., CA, **$1,542,000.** Intake No. 2, R. C. Harris Water Purification and Pumping Plant, Queen St. E., TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. CD 9/20, under LB.

LATIN AMERICA

BUILDINGS—LB & CA

▲ **Fiat,** Turin, Italy, CA Total est., **$124,000,000,** STEEL MILL, Bolivar State, VENEZUELA. Republic of Venezuela, Caracas, Venezuela. CD 6/14/51.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., Monrovia**—City, City Hall, voted **$1,640,310** bonds, water system imprvs. CD 8/17.

▲ **Ky., Newport**—Campbell County Water Dist., Fourth and York Sts., project abandoned, water plant, incl. mfg. treatment, standby and pumping facilities, **$1,934,600.** CD 7/18.

▲ **Neb., Omaha**—Metropolitan Utilities Dist., 18 and Harney Sts., 54 in. water main from 30th and Ernst Sts. to 31st and Binney Sts. **$1,000,000.** J. C. Detweiler, c/o owner, water engr.

▲ **Okla., Duncan**—City, voted bonds Sept. 13, reservoir and WW exten. **$1,800,000.** J. B. Davidson, city engr. CD 8/1.

▲ **Tex., Beaumont**—City, City Hall, defeated bonds Sept. 13, water pumping unit, **$150,000;** water storage, **$100,000;** c.i. water mains, **$1,500,000;** water distr. sys. **$3,450,000.** CD 8/24.

▲ **Wash., Seattle**—City, County-City Bldg., Seattle, Zone 4, 2 pipe lines from Tolt River **$7,000,000** each, first to be completed by 1960 second by 1971; dam on Tolt River **$3,500,000;** Tolt River diversion work, **$450,000;** connecting line from Rivers' north fork **$625,000;** Lake Forest Park reservoir, **$1,000,000,** work to start 1958; North End distribution feeders, **$3,972,000;** South End distribution feeders, **$4,100-000;** relining old steel pipe **$2,260,000;** replacing and enlarging Lake Youngs supply lines **$2,712,000;** dam on Cedar Lake, **$2,000,000.** CD 5/14/54; pipe line to Mercer Island, **$1,440,000,** CD 3/22/54; South Central distribt. lines, **$1,700,000.**

SEWERS, WASTE DISPOSAL

Fla., Miami—City, 3332 Pan American Dr., Zone 33, **$825,000** bond election Nov. 8, 300 ton incinerator at Coconut Grove.

▲ **Md., Hyattsville** — Washington Suburban Sanitary Comn., Hamilton St.,
Rock Creek trunk sewer, to extend the Rock Creek trunk sewer to confluence of Rock and Mill Creeks, construct outfall sewer up Mill Creek to its headquarters at Washington Grove, constr. sewage pumping station and force main, Gaithersburg, Rockville, **$1,159,700;**
Henson Creek trunk sewer incl. trunk sewer from Morningside to Bock Rd., pumping station and force main, Suitland, **$1,147,200;**
Cabin John Creek trunk sewer to take care of Cabin John Valley with 7 mi. trunk line connecting with Rockville, Cabin John, **$976,300;**
Indian Creek trunk sewer to provide eventual elimination of Greenbelt sewage treatment plant, College Park, **$480,900;**
Paint Branch trunk sewer to exten. line from terminus at University of Maryland to point opposite Hollywood subdivision, Hollywood, **$846,900;**
Largo sewage pumping station and force main, Southwest Branch of Patuxent River, Largo, **$189,700;**
Patuxent trunk sewer, Laurel, **$212,000;**
interceptor to take sewage from Howard County area to Patuxent trunk sewer, Laurel, **$100,100;**
sewage works, first unit at point east of Baltimore-Washington Parkway, along Patuxent River, 2nd unit built at later date, Laurel, **$800,000;**
Brier Ditch-Seabrook proj., trunk sewer, sewage pumping stations and force mains, Riverdale and Lanham, **$635,400;**
Northwest Branch trunk sewer to exten. this line to the confluence of Northwest and Little Northwest Branches above Glenmount Rd., Silver Spring, **$721,000;**
Sligo Branch relief sewer, Takoma Park, **$94,600.**

▲ **Ont., Kitchener**—City, City Hall, sewage treatment plant extens. **$2,000,000.** CD 6/24/53.

BRIDGES

▲ **Fla., Miami**—City, 3332 Pan American Dr., Zone 33, $3,600,000 bond election Nov. 8, replacing South Miami Bridge with 5-lane bascule span over Miami River from S. E. 1 St. to Miami Avenue Rd. Construction cost **$2,500,000.** CD 11/8/44.

▲ **NORTH CAROLINA**—State Hy. & P. Wks. Comn., Raleigh,
Dare and Tyrrell Counties—bridge across Alligator River on U. S. 64 between Sandy Point and East Lake Draw Span, Proj. 1907. **$3,000,000.** W. H. Rogers, Jr., state hy. engr.

▲ **Tex., Houston**—Comr. Court, Harris Co., Court House, defeated bonds Sept. 17, steel, concrete bridge across Ship Channel and approach roads work. **$10,000,000.** Frank Baldwin, dir. P. Wks. CD 8/15.

STREETS AND ROADS

▲ **Fla., Miami**—City, 3332 Pan American Dr., Zone 33, bond election Nov. 8, **$3,475,000** street imprvs., incl. North Miami Dr., N. E. Court St., N. E. 82 St. and N. W. 35 St. CD 11/30/53.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton,

Bergen Co.—Bergen Expressway from George Washington Bridge to Route 46 at Clifton. **$85,000,000.**

▲ **Tex., Beaumont**—City, City Hall, defeated bonds Sept. 13, repairing, resurf. existing streets, **$1,500,000**; new street paving, **$4,500,000**; freeways, **$1,500,000**. CD 8/24.

EARTHWORK, WATERWAYS

▲† **Alabama**—U. S. Eng., P.O. Box 1169, 2301 Grant St., Mobile, Zone 7, excavation, earth dam and spillway Lock approach, Warrior Lock & Dam, **$5,000,000-$10,000,000.** Bids about May, 1956.

▲† **Alabama**—U. S. Eng., P.O. Box 1169, 2301 Grant St., Mobile, Zone 7, four 45,400 h.p. kaplan type turbines, **$1,000,000-$5,000,000.** Bids about January, 1956; four 32,500 kw generators, **$1,000,000-$5,000,000.** Bids about February, 1956, both for Fort Gaines Dam. CD 8/17.

▲† **Alabama**—U. S. Eng., P.O. Box 1169, 2301 Grant St., Mobile, Zone 7, dredging, deepening to provide 36 ft. depth, Mobile Harbor. **$1,000,000-$5,000,000.** Bids about November. CD 8/30/54.

▲ **California**—State Dpt. P. Wks., P. Wks. Bldg., Sacramento, flood control and power dam and appurtenances in Feather River above Oroville to provide water for Southern California and San Joaquin Valley. **$1,500,000,000.** Bechtel Corp., engrs., 200 Bush St., San Francisco, Calif., will review state engineer's plans. CD 3/14/52, under Calif., Sacramento.

▲ **Florida**—U. S. Eng., P.O. Box 4970, Jacksonville, channel dredging 34 ft. depth, Tampa Harbor. **$1,000,000-$5,000,000.** Bids about December. CD 11/24/43.

▲† **Georgia-South Carolina**—U. S. Eng., 200 East St. Julian St., Savannah, Ga., excavation and embankment, earth dam, **$1,000,000-$5,000,000,** Bids about September 1955; highway relocation 2.0 mi. U. S. Hy. 29 **$100,000-$1,000,000,** and sluice gates and guides **$100,000-$1,000,000,** Bids about January 1956; bridge on U. S. Hy. 29 **$100,000-$1,000,000,** Bids about February 1956, above work for Hartwell Reservoir. CD 9/14.

▲† **Michigan**—U. S. Eng., 600 E. Jefferson Ave., Detroit, Zone 26, breakwater dredging, Port Austin Harbor, **$1,000,000-$5,000,000.** Bids about Feb. 1.

▲† **North Carolina**—U. S. Eng., 308 Custom House, Wilmington, channel imprv., two rubble mound breakwaters, Rollinson Channel, Pamlico Sound, Hatteras, **$100,000-$1,000,000,** Bids about October 1955; dredging Inside Channel, 34 ft. deep, 27 mi. long, Wilmington Harbor, **$1,000,000-$5,000,000,** Bids about January 1956.

▲ **Oregon**—Portland General Electric Co., 621 S. W. Alder St., Portland, 2,300 ft. diversion tunnel from Cazadero dam to Faraday power plant, 25,000 kw, generator at Faraday, **$5,700,000;** concrete-arch dam, Clackamas River at North Clackamas site, 135 ft. head, 620 ft. long, two generators, **$13,300,000,** both in Clackamas Co. Start early 1956. Ebasco Services, Inc., 2 Rector St., New York, N. Y. consult. engrs. John Bankus, c/o owner, engr.

▲ **Texas**—Canadian Municipal Water Auth., Plainview, bond election Nov. 8, constr. Canadian River dam and facility to provide water service to nine Panhandle, South Plains and West Texas cities to be built near Sanford. **$74,800,000.** CD 8/11.

▲† **Washington**—Bureau Reclamation, Dpt. Interior, Customhouse, Denver, Colo., irrigation works for land near Chief Joseph Dam, Bridgeport, **$4,615,000.** Bids for first unit a **$631,000** pumping plant after January 1. CD 8/13/52.

AIRPORTS

▲† **Fla., Tampa**—PARKING APRON, etc.—U. S. Eng., P. O. Box 4970, Jacksonville, parking apron and runway **$1,000,000-$5,000,000.** Bids about September, airmen's dormitories, **$1,000,000-$5,000,000,** Bids about October, above work at MacDill Air Force Base. CD 8/18.

▲† **Ga., Albany**—PARKING APRON, etc.—U. S. Eng., 200 East St. Julian St., Savannah, parking apron **$1,000,000-$5,000,000,** Bids About September; airmen's dormitories, **$1,000,000-$5,000,000.** Bids about October, above work at Turner Air Force Base.

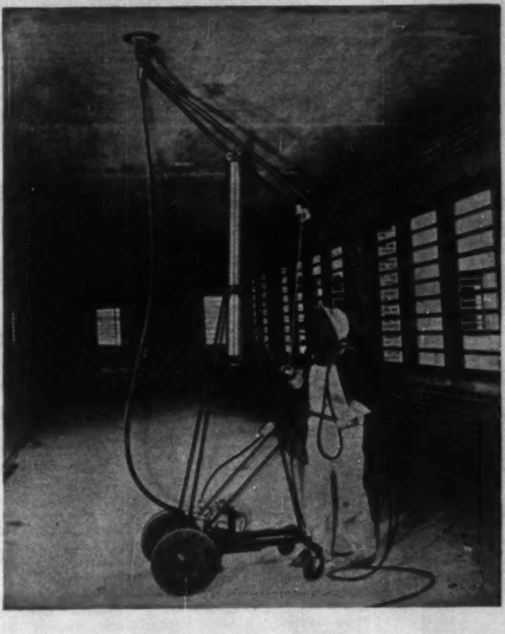
▲† **Ga., Macon**—PARKING APRON, etc.—U. S. Eng., 20 East St. Julian St., Savannah, parking apron **$1,000,000-$5,000,000,** airmen's dormitories **$300,000-$1,000,000,** Bids about October; general purpose shop, **$300,000-$1,000,000,** Bids about September, above work at Robins Air Force Base.

▲† **Ga., Valdosta**—HANGARS, etc.—U. S. Eng., 200 East St. Julian St., Savannah, maintenance hangar **$300,000-$1,000,000,** Bids about January; airmen's dormitories, **$300,000-$1,000,000,** Bids about October, above work at Moody Air Force Base.

▲ **O., Akron**—AIRPORT IMPRVS.—Bd. Comrs. Summit and Stark Counties, Court House, imprv. Akron-Canton Airport, incl. terminal bldg., aircraft apron, service court, roads and parking space, utilities, **$1,368,000,** Landrum & Brown, 111 E. 4 St., Cincinnati, airport consultants. CD 2/24.

▲† **Okla., Clinton** — AIR BASE — Eighth Naval Dist., Building 16, U. S. Naval Station, New Orleans (Algiers) La., Clinton-Sherman Air Force Base, incl. pavement, fuel dispensing facilities, operational, aircraft maintenance, training, storage personnel, administration, community and shop facilities, family housing and utilities for Dpt. of Air Force. **$10,208,500.**

RUBBING CEILINGS?



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▲ **S. C., Charleston**—AIRPORT—City, William McG. Morrison, mayor, City Hall, airport to replace present airport being taken over by U. S. Air Force. $1,000,000.

LATIN AMERICA

▲ **Mexico, Vera Cruz**—Republic Steel Corp., Oliver Bldg., Pittsburgh, Pa., U. S. A. and Associated Mexican Companies, Mexico City, Mexico, plan steel mfg. plant. $60,000,000.

AMERICANS ABROAD

▲ **France**—California Spray-Chemical Cie, Francaise, c/o California Spray-Chemical Corp., Lucas and Ortho Way, Richmond, Calif., U. S. A. plans captan plant, $1,500,000.

PUBLIC BUILDINGS

▲† **Ariz., Yuma**—SHOPS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., misc. shops and car shelters Yuma Test Station **$1,500,000**. J. H. Pomeroy & Co., Inc., 727 W. 7 St., Los Angeles, Calif., consult. engr. CD 12/11/52.

▲ **Calif., Lafayette**—SCHOOLS—Acalanes Union High School Dist., Lafayette, **$3,250,000**, bond election Nov. 22, school construction.

▲ **Colo., Denver**—SCHOOLS—School District No. 1, 414 14 St., **$40,000,000** bond election in November or December, school expansion, incl. 4 new Senior High Schools, 3 Junior High and 5 Elementary Schools, 18 existing schools addns. and a high school sports stadium. CD 10/10/52.

▲† **Ga., Fort Benning**—THEATRE, etc.—U. S. Eng., [illegible] Julian St., Savannah, theatre, **$300,000-$1,000,000**; classroom bldgs. **$300,000-$1,000,000**. Bids about December; E. M. barracks, over **$5,000,000**. Bids about February; 150-unit family housing, **$1,000,000-$5,000,000**. Bids about November.

▲ **Ill., Aurora**—SCHOOL—School District 129, 152 Glenwood St., plans by Berger & Kelly, 44 Main St., Champaign, West Side Junior High School. **$1,350,000**.

▲ **Ind., South Bend**—HIGH SCHOOL—School City of South Bend, plans by Maurer & Maurer, Lafayette Bldg. Washington High School addns. **$1,250,000**.

▲ **Mich., Detroit**—DETENTION HOME—Bd. Supervs. Wayne Co., City-County Bldg., Juvenile Detention Home, Forest, Rivard, Hancock and Riopelle Sts. **$3,200,000**.

▲ **Mich., Southfield**—SCHOOLS—Bd. Educ. voted **$3,500,000** bonds Sept. 12, Junior and Elementary Schools. CD 8/11.

▲† **N. C., Camp Lejeune**—FACILITIES, etc.—P. Wks. Office, Marine Corps Base, personnel and security facilities, utilities. **$1,059,000**.

▲ **O., Cincinnati**—SCHOOL—Bd. Educ., 608 E. McMillan St., 2 story, basmnt., Washington Park Elementary School, 12 and Elm Sts. **$1,250,000**, A. M. Kinney, Inc., Vernon Place, Cincinnati, consult. engrs. CD 11/5.

▲ **O., Massillon**—SCHOOL—Perrysburg Twp. Bd. Educ., **$1,140,000** bond election Dec. 13, high school addn., school. CD 11/18.

▲† **O., Sandusky** — LABORATORY — National Advisory Committee for Aeronautics, 1512 H St. N.W., Wash., D. C., nuclear propulsion laboratory as branch of Lewis Flight Propulsion Laboratory of Cleveland, built on site of old Plum Brook Ordnance Reservation 3 mi. south of here. **$5,000,000**.

▲ **Ore., Eugene**—HIGH SCHOOL—Eugene School Dist., Eugene bond election Oct. 20, high school. **$2,750,000**.

▲ **S. D., Rapid City**—SCHOOLS—Rapid City School Bd., 6 and Columbus Sts., **$3,000,000** bond election Nov. 15, two Junior High Schools, three elementary schools, remodeling Washington High School.

▲ **Tex., Arlington** — SCHOOL — Arlington Independent School Dist., c/o James W. Martin, supt., Arlington, voted bonds Sept. 17, school imprvs. **$3,000,000**. Preston M. Geren, 1607 Fort Worth Natl. Bldg., Fort Worth, archt. CD 9/8.

▲ **Tex., Austin**—STATE HEALTH OFFICE—State of Texas, c/o Dr. Henry Holle, State Health Dpt., Austin, plans by Page, Southerland & Page, 602 West Ave., State Health Dpt. Office Bldg., three 3 story wings and three 1 story wings, approx. 215,000 sq. ft. **$3,750,000**.

▲ **Tex., Austin** — TRAINING — Bd. for Texas State Hospitals & Special Schools, Austin, plans by Page, Southerland & Page, 602 West Ave., 1 story 320x417 ft. receiving and intensive training bldg., at Austin State Hospital. **$1,500,000**. Wilson & Cottingham, Brown Bldg., structural engrs. Walter C. Moore, c/o owner, engr. CD 10/2/52.

▲ **Tex., Pasadena**—AUDITORIUM—City, voted bonds Sept. 3, auditorium. **$1,250,000**. CD 7/20.

▲ **Wash., Seattle**—ADMINISTRATIVE CENTER—City, County-City Bldg., Zone 4, 110,000 sq. ft. North End Administrative Center. **$1,750,000**.

▲ **Wash., Seattle**—DORMITORY—University of Washington, Seattle, Zone 4, plans by Young, Richardson, Carleton & Detlie, Central Bldg., Zone 4, men's dormitory addns. **$2,600,000**. Bids after January 1. CD 9/20/49.

▲ **Wash., Steilacoom**—SCHOOL—Clover Park School Dist. No. 400, Steilacoom, plans by C. Rueger & Assocs., 225 S. Tacoma St., Tacoma, Junior High School. **$1,088,000**. Bids early next year. CD 11/10.

COMMERCIAL BUILDINGS

▲ **N. Y., Nanuet** — SHOPPING CENTER, etc. — New York Interiors, Inc., c/o A. H. Salkowitz, archt., 87-25 Homelawn St., Jamaica, Zone 32, shopping center; plans by John J. McNamara, 132 W. 43 St., New York, Zone 36, drive-in-theater on 50 acre tract on Rte. 59, **$2,000,000**.

▲ **N. Y., New York**—APARTMENT—F.B.F. Constr. Co., 1472 Broadway, plans by Sylvan Bien, 33 W. 46 St., Zone 19, apartment, 120-24 University Place, **$1,500,000**.

▲ **N. Y., New York**—HOSPITAL—New York Foundling Hospital, 175 E. 68 St., plans by Eggers & Higgins, 100 E. 42 St., Zone 17, 11 story foundling hospital, 1175-1185 Third Ave. between 68 and 69 Sts., **$4,000,000**. CD 9/23/54.

▲ **N. Y., Ossining**—HOME—Bethel Methodist Home for Aged, Narraganset Ave., plans by Ferrenz & Taylor, 152 W. 42 St., New York, Zone 36, 3 story home for aged, **$1,000,000**.

▲ **N. Y., Potsdam**—DORMITORY—Thomas S. Clarkson Memorial College of Technology, Potsdam, dormitory, **$1,000,000**.

▲ **O., Toledo**—HOMES—Howard A. Schneider, Inc., 1040 Laskey Rd., plans by James A. Risser, 6122 Sylvan Green, Sylvania, 45 homes in suburban Ottawa Hills area, section to be known as Bonniebrook in the Hills, **$2,000,000**.

▲ **Tex., Austin**—OFFICE—E. G. Kingsberry & Assocs., c/o Austin Statesman, 308 Guadalupe St., 21 story office. **$2,000,000**.

▲ **Tex., Houston**—SHOPPING CENTER—First Mortgage Co., c/o Thompson-McCleary, Werlin & Kiefner, archts., 2017 W. Gray St., frame, stone, brick shopping center, rein.-con. fdns., in Meyerland Subdivision, Post Oak Rd. at Bechnut St. **$3,500,000**. R. L. Reid, 2506 Richton St. and James H. Howard, 4101 San Jacinto St., consult. engrs.

▲ **Wash., Seattle**—SHOPPING CENTER—Eastgate Investment Co., c/o Bordon Campbell, 6401 Carleton St., shopping center, Sunset Hy. east of here **$10,000,000**.

▲ **Wash., Seattle**—HOMES—Guthrie Constr. Co., 10703 Renton Ave., 2,000 home project, Evergreen Hills addn., south of here, **$30,000,000**. Six-year program.

▲ **Ont., Sarnia**—HOUSING—Woodhaven Park Development, Colborne Rd., 125-unit housing development, Colborne Road and Michigan Ave. **$1,300,000**.

▲ **Ont., Toronto**—HOTEL—J. D. Crashley, Elgin Motors Ltd. 123 Front St. W., plans by John B. Parkin & Assocs., 717 Church St., 24 story 1,050 room HOTEL, 2 level underground parking, York and Front Sts., southwest corner, **$20,000,000**.

▲ **Que., Montreal**—HOUSING—Columbia Construction Inc., Dominion Square Bldg., 135 bungalows in housing development at Ste. Genevieve **$1,400,000**.

▲ **Que., Montreal**—OFFICE, etc.—Isadore Feldman, 1396 Notre Dame St. W., 20 story, 12,000 sq. ft. office bldg. and parking garage. **$4,000,000**. T. P. Keith & Assocs., 4935 Clanranald Ave., engrs. CD 9/16.

▲ **Que., Montreal** — HOUSING — Manoir Development Corp., c/o Harry Stilman, archt., 2183 Maplewood Ave., will not construct housing development in St. Vincent De Paul suburban area. **$1,500,000**. Project abandoned. CD 4/27.

INDUSTRIAL BUILDINGS

▲ **Calif., Antioch** — PLANT — Crown-Zellerbach Corp., 343 Sansome St., San Francisco, 170,000 sq. ft. bag plant, **$2,000,000**.

▲ **Ga., Savannah**—PLANT—Southern Nitrogen Co., Savannah, petrochemical plant, **$14,000,000**.

▲ **Miss., Columbus**—PLANT—American Bosch Arma Mississippi Corp., Columbus, electric equipment plant, **$1,164,400**.

▲ **O., Canton**—PLANT—Macomber, Inc., 1925 10 St., N.E., 260,000 sq. ft. plant to mfg. steel frames on 50 acre site between Canton and Louisville. **$1,500,000**.

▲ **O., Dayton**—PLANT—General Motors Corp., Moraine Products Div., 1420 Wisconsin Ave., 230,000 sq. ft. auto parts plant addn. **$2,000,000**, total est. with equip. $11,000,000.

▲ **O., Eaton**—FACTORY—Hinde & Dauch Paper Co., Chas. E. Frohman, pres., 407 Decatur St., Sandusky, corrugated box factory, **$2,500,000**.

▲ **Texas** — COMPRESSOR STATION — Texas Eastern Transmission Corp., Texas Eastern Blvd., Shreveport, La., compressor station with auxiliary bldgs. on 95-acre tract, Vidor. **$1,500,000**.

▲ **Tex., Borger**—PLANT—Phillips Petroleum Co., Bartlesville, Okla., plant expans. (co-polymer unit). **$2,000,000**. CD 11/15/51.

▲ **Tex., Port Neches**—PLANT, etc.—Goodrich-Gulf Chemicals, Inc., and Texas U. S. Chemicals, Port Neches, butadiene plant expansion. **$1,500,000**; synthetic rubber plant expansion. **$1,500,000**.

UNCLASSIFIED

▲ **Fla., Miami**—TUNNEL—City, 3332 Pan American Dr., Zone 33, $12,700,000 bond election Nov. 8, six lane tunnel to carry N. W. 1 St. and Flagler St. under Miami River. Construction cost **$9,800,000**. Will replace West Flagler St. Bridge.

▲ **Tex., Houston**—WHARVES—Port Commission Navigation Dist., Wharf No. 3, defeated bonds Sept. 17, Job. 1, uncovered wharf, **$2,000,000**; Job 6, covered wharf with transit shed, **$2,200,000**; Job. 7, covered wharf with transit shed, **$2,200,000**; truck loading facilities, **$300,000**; marine leg unloading facilities, **$500,000**; soil dumping and filling area, **$1,000,000**. Lockwood & Andrews, Union Natl. Bank Bldg., and Robert J. Cummins, Bankers Mortgage Bldg., consult. engrs. CD 8/15.

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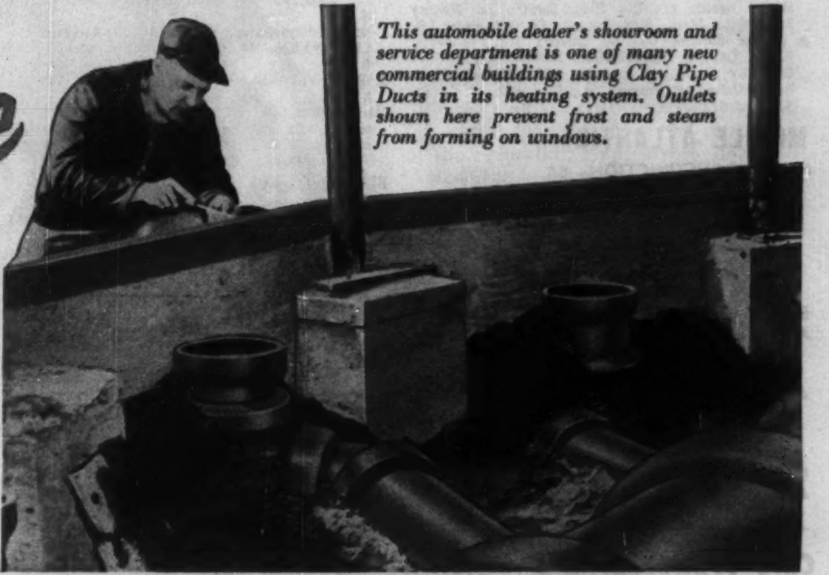

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Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—LB & CA

▲ **S. Volpe & Co., Inc.**, 185 Devonshire St., Boston, Mass. LB **$1,463,000**. W-702 Contr. 1, Commonwealth Pier No. 5, South Boston, BOSTON, MASS. Commonwealth of Mass., Port of Boston Comn., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Sept. 22. CD 9/8.

▲ **CONNECTICUT**—State Hy. Comn., State Office Bldg., Hartford,

D. V. Frione, 87 Foxan St., New Haven, Conn., LB, **$1,589,963**, Section 317, Contr. 01-Proj. 317-04, hy. work, Greenwich-Killingly Expressway, New Haven. Bids Sept. 19. CD 9/8.

BUILDINGS—LB & CA

▲ **Park Constr. Co., Inc.**, 40 Court St., Boston, Mass., CA, **$1,660,805**. M-615, ADMISSION BLDG., Metropolitan State Hospital, WALTHAM, MASS. State Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Sept. 2. CD 9/7, under LB.

▲ **Gilbane Building Co.**, 90 Calverly St., Providence, R. I. CA Est. **$3,000,000**. DORMITORIES, PSYCHOLOGY BLDG. on campus, PROVIDENCE, R. I. Brown University, Prospect St., Providence, R. I. CD 5/5 and 9/28.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 11 Maryland   October 13, 18 New Jersey
October 27 New York

STREETS AND ROADS

October 11 Delaware   October 13 New Jersey
October 27 New York

BUILDINGS—BA

▲ **N. Y., Scarsdale**—HIGH SCHOOL—BA 10/18—Bd. Educ., Brewster Rd., Junior High School, $3,000,000. Starrett & Van Vleck and Reginald Marsh, 267 Fifth Ave., New York, Zone 16, archts. CD 11/4.

▲ **Pa., Brockway**—SCHOOL—BA 10/20—Brockway Joint School Dist., High School, Brockway, 2 story, brick Junior and Senior High School, $1,500,000. Hunter, Caldwell & Campbell, 3601 Fifth Ave., Altoona, archts. CD 7/8/54.

BUILDINGS—SLC

▲ **N. J., Lawrenceville**—SCHOOL—Roman Catholic Diocese of Trenton, 153 N. Warren St., soon lets contract regional high school, Lawrence Twp. $2,500,000. William W. Slack & Son, 140 W. State St., Trenton, archts. CD 9/6.

HEAVY CONSTRUCTION—BA

▲ **NEW YORK**—Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,

H. L. Baughman, Inc., 1240 Jefferson Rd., Rochester, N. Y. LB **$1,125,349**. twin bridges and approaches Carry divided lanes Erie Section Thruway over 6 tracks N.Y.C., Pennsylvania and Nickel Plate R.R. near Swede Rd., town of Portland, Chautauqua Co. Bids Sept. 22. CD 8/29, under Streets and Roads.

▲ **M. A. Bongioanni**, 309 Sunset Ave., Syracuse, N. Y. LB **$1,319,420**. (7 bidders) general contract heating tunnels and service connections Craig Colony, SONYEA, N. Y. Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Sept. 22, CD 9/1;

Joseph Davis, Inc., 120 W. Tupper St., Buffalo, N. Y. LB **$563,773**. (9 bidders) heating work. (Sonyea, N. Y.);

Horacek-Hayden, Inc., PO Drawer 709, Rochester, N. Y. LB **$693,826**. (4 bidders) electric work. (Sonyea, N. Y.)

▲ **PENNSYLVANIA**—Pennsylvania Turnpike Comn., 11 N. Fourth St., Harrisburg,

Latrobe Road Constr. Co., Latrobe, Pa. CA **$3,678,391**. constr. 4.53 mi. (Sec. 37 L), northeastern extension of Turnpike in city of Scranton and South Abington Twp., Lackawanna Co. CD 9/6, under LB.

BUILDINGS—LB & CA

▲ **Allied Homes**, c/o A. H. Salkowitz, archt., 87-25 Homelawn St., Jamacia, N. Y. Owner Builds. **$5,000,000**. 300 HOUSES on tract bounded by 76 St., 79 St., 30 Ave., and 31 Ave., JACKSON HEIGHTS, N. Y.

▲ **Vermilyea-Brown Co., Inc.**, 100 E. 42 St., New York 17, N. Y. CA Est. **$1,300,000**. 6 story NURSING HOME, 64-71 Jackson, St., NEW YORK, N. Y. Dominican Sisters, c/o Eggers & Higgins, archts., 100 E. 42 St., New York 17, N. Y. CD 10/27/54.

▲ **Monterey Village Homes**, c/o Klein & Parker Realty Co., 1391 Northern Blvd., Roslyn, N. Y. Owner Builds, **$2,400,000**. 200 HOUSES on tract on Montauk Highway east of Lakeland Ave., SAYVILLE, N. Y.

▲ **Sea Wood Harbor Homes**, c/o George H. Beckmann, Inc., State Highway 4, Teaneck, N. J. Owner Builds, **$4,800 000**. 400 HOUSES on 100-acre tract in Brick Twp., near POINT PLEASANT, N. J.

▲ **Catalytic Constr. Co.**, 1528 Walnut St., Phila., Pa. CA est. **$4,00,000**. design and construct 40,000 ton per year butadiene PLANT, POTTSTOWN, PA. Firestone Tire & Rubber Co., Pottstown, Pa. CD 8/6/51.

▲ **Housing Development Corp.**, 7961 Eastern Ave., Silver Spring, Md., Owner Builds, **$6,000,000**. 225 HOMES, 25-acre tract near Fernwood Rd. and Bradley Blvd., to be known as Fernwood, BETHESDA, MD. J. 'd'Etagnier, 1004 Ripley St., Silver Spring, Md., and William J. Fedeli, 1809 Georgia Ave. N.W., Wash, D. C., archts.

▲ **United Engineers & Constructors, Inc.**, 1401 Arch St., Phila., Pa., CA **$30,000,000** design and construct electric power GENERATING PLANT, MILLSBORO, DEL. Delaware Power & Light Co., 600 Market St., Wilmington, Del

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 12 Louisiana   October 14 Kentucky

STREETS AND ROADS

October 12 Louisiana   October 14 Kentucky

▲† **La., New Orleans**—RUNWAY—BA 10/26—Officer in Charge of Constr., Eighth Naval Dist., Bldg. 16, U. S. Naval Station, New Orleans (Algiers), runway 13-31, taxiways and aprons, etc., Joint Air Reserve Training Center, Alvin Callender Field, NOY 86352. Spec. 43912. Plans deposit $40. CD 11/17/53.

▲ **Virginia**—TUNNEL—BA 11/16—Commonwealth of Va., Dpt. Hys., Central Highway Office Bldg., 1221 E. Broad St., Richmond, Zone 19, Hampton Roads Proj., Contr. No. C-3 for constr. cut and cover tunnel sects., ventilation bldgs. and tunnel open approaches; crash truck bldgs., incl. foundations, mechanical and electrical work complete; misc. work, incl. railings on tunnel and bridge approaches, hand rail in tunnel, police booths and sidewalks, curbs and walls, and rough grading on Portla Islands. Plans deposit $82.50. Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, N. Y., engrs.; adv. ENR 10/6. CD 6/3/53.

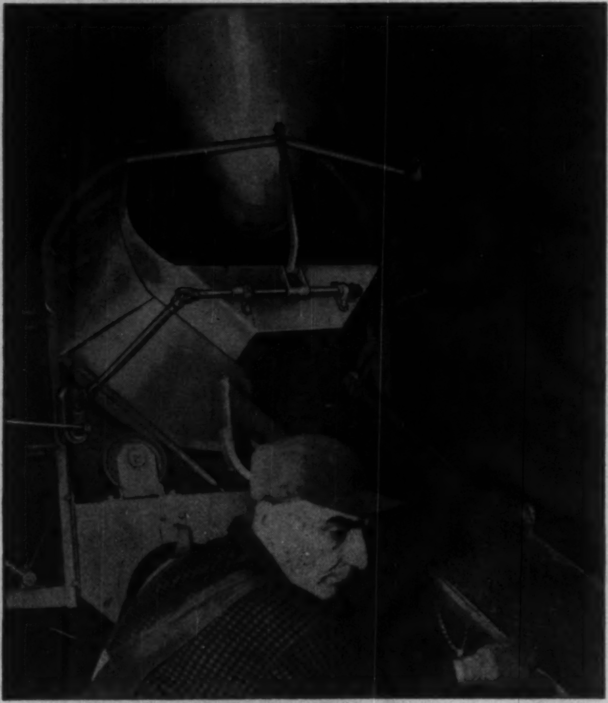
HEAVY CONSTRUCTION—LB & CA

▲ **GEORGIA**—State Hy. Dpt., 2 Capitol Sq., Atlanta,

Ga.—**Foster & Creighton**, American National Bank Bldg., Nashville, Tenn., CA, **$1,260,482**. grading, paving, wid'n., reconstr. 4.932 mi. State Rtes. 85 and 1, FAP U 011-1 (5) and 174-1 (1) and F 074-1 (5), Muscogee Co.;

Ga.—**Suber & Co., Inc.**, Whitmire, SC., CA, **$1,189,755** grading, paving, 5.235 mi. State Rte. 13, FAP FI-013-1 (4), Gwinnett Co.;

CMC Transcretes & batching equipment bring users real savings . . .



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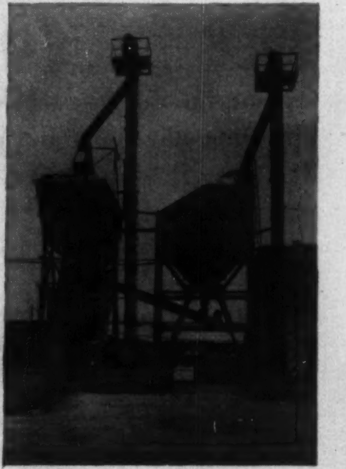

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Ga.—**E. F. Groover**, Box 568, Moultrie, Ga., CA, **$691,241**. grading, paving, wid'n., resurf., new constr. 11.262 mi. Moultrie-Sylvester Rd. 33 and Moultrie-Tifton Rd., State Rte. 35 reconstr. 1.034 mi. Tifton Rd. FAP F 033-1 (3), F 033-1 (4) and F 098 (1), Colquitt Co.;

Ga.—**Wright Contg. Co.**, Box 1537, Columbus, Ga., CA, **$521,710**. wid'n., reconstr., resurf. 12.362 mi. and widen bridge over Flint River, State Rte. 85, FAP F 074 (2) (4), Fayette and Clayton Counties. Grand total $3,663,188. Bids Aug. 19. CD 8/25, under LB.

▲ **LOUISIANA**—The Mississippi River Bridge Auth., 422 City Hall Annex, New Orleans,

Bethlehem Steel Co., E. 3 St., Bethlehem, Pa., CA, **$12,268,580**. superstructure Mississippi River Bridge crossing the greater New Orleans Bridge over the Mississippi River. Bids Sept. 27. CD 9/29, under LB.

▲ **LOUISIANA**—State Hy. Dpt., Highway Office Bldg., Baton Rouge,

La.—**T. L. James & Co., Inc.**, Ruston, La. LB **$1,021,554**. (5 bidders) wid'n. c. conc. 16.159 mi. Bonnet Carre Spillway-Shrewsbury Hy., La. U. S. Rte. 61, S.P. 7-03-20 and 7-02-29, St. Charles and Jefferson Parishes;

La.—**Jahncke Service, Inc. & McWilliams Dredging Co.**, 814 Howard Ave., New Orleans, La. LB **$2,853,895**. (2 bidders) hydraulic embankment 13.754 mi. Manchac-Frenier Hy., State Rte. 33, S.P. 17-02-24 and 17-01-11, Tangipahoa and St. John the Baptist Parishes;

La.—**Bedsole & Shetley**, Box 192, Mansfield, La. LB **$139,472**. (4 bidders) bit. surf. tr. 6.2 mi. Ashland-Saline Hy., State Rte. 155, S.P. 307-01-03, Bienville Parish;

La.—**Continental Constructors, Inc.**, Box 407, Baton Rouge, La. LB **$223,803**. (4 bidders) bit. surf. tr. 8.499 mi. Kilbourne-Concord Hy., State Rte. 207, S.P. 332-03-06, West Carroll Parish;

La.—**W. R. Core**, Covington, La. LB **$272,760**. (3 bidders) bit. surf. tr. 6.229 mi. Tangipahoa Parish Line-Ramsey Hy., State Rte. 1723, S.P. 852-06-06, St. Tammany Parish;

La.—**R. T. Henry**, Dubach, La. LB **$190,688**. (5 bidders) bit. surf. tr. 5.885 mi. Mt. Union-Lockhart Hy.; State Rte. 440, S.P. 154-30-03, Union Parish;

La.—**T. W. Kleinpeter**, Box 4686, Audubon Station, Baton Rouge, La. LB **$223,967** (4 bidders) bit. surf. tr. 7.786 mi. Jarreau-Glynn Hy., State Rte. 414, 415, 416 and 983, S.P. 839-13-02, 224-02-09 and 224-01-04, Pointe Coupee Parish;

La.—**J. G. Madden**, Box 1048, Minden, La. LB **$132,498**. (3 bidders) bit. surf. tr. 5.2 mi. Cotton Valley-Leton Hy., State Rte. 182, S.P. 85-05-09, Webster Parish;

La.—**W. H. Patterson & Co.**, Box 2229, Baton Rouge, La. LB **$174,416**. (6 bidders) bit. surf. tr. 7.66 mi. Hubert-Richland Parish Line Hy., State Rte. 208, S.P. 71-01-04, Caldwell Parish; LB **$204,453** (5 bidders) bit. surf. tr. 9.794 mi. Baskin-Delhi Hy., State Rte. 240, S.P. 168-01-07, Franklin Parish;

La.—**G. E. Steed, Contractor**, Box 535, Springhill, La. LB **$97,473**. (6 bidders) bit. surf. tr. 7.699 mi. Verda-Atlanta Hy., State Rte. 5, S.P. 123-02-03 and 123-03-03, Grant and Winn Parishes;

La.—**Walden & Williams**, Box 738, Mansfield, La. LB **$96,354**. (3 bidders) bit. surf. tr. 5.25 mi. Mansfield-Clear Lake Hy., State Rte. 509, S.P. 105-01-03 and 105-02-03, DeSoto Parish. Bids Sept. 21. CD 8/31 and 9/9.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

November 22 Ohio

▲† **Ohio and West Virginia**—BA 10/30—U. S. Eng., 925 Federal Bldg., Pittsburgh 19, Pa., 110x1,200 ft., main lock and 110x600 ft. auxiliary lock with 2 parallel lock chambers on Ohio side, New Cumberland Locks and Dam, Ohio River. $7,000,000. CD 8/18.

BUILDINGS—BA

▲ **Mich., Detroit** — SCHOOL — BA 10/19 — City, Bd. Educ., 1354 Broadway, Amelia Earhart High School, 7 Mile Rd. between Hoover and Bradford Sts. $5,000,000. Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., archt. CD 2/9.

▲ **Ill., Chicago**—OFFICE—BA 10/24—Inland Steel Co., 38 S. Dearborn St., 17 story office, Monroe and Dearborn Sts. $6,000,000. Skidmore, Owings & Merrill, 100 W. Monroe St., Zone 3, archts. CD 10/5/54.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15,

O.—**Baker & Hickey Co.**, P. O. Box 5008, Tri-Village Station, Columbus, O. CA **$2,278,854**. est. $2,498,000. Type T-71 and structure 1.914 mi. S. R. 120, Section 2.05 (Part No. 7-Toledo Expressway System), UI-1052 (6) Oregon Twp. and city of Toledo, Lucas Co. CD 9/21, under LB;

O.—**Ohio Engineering Co.**, 105 Sixth St., Lorain, O. CA **$501,737**. est. $518,900. Type T-35 2.556 mi. S. R. 254 sections (2.40-3.38) S 951 (4), U-1094 (1), Black River, Sheffield, Amherst and Elyria Twps., Lorain Co.;

O.—**Harper Supply, Inc.**, 118 W. Front St., Napoleon, O. CA **$784,447**, est. $779,800. Type T-35 on B-20 and structure 4.1 mi. U. S. R. 224, section 10.66, Hopewell, Clinton and Eden Twps., Seneca Co.;

O.—**V. N. Holderman & Sons, Inc.**, 890 Oakland Park Ave., Columbus, O. CA **$966,611**, est. $1,155,000. Type T-71 and structures 5.835 mi. U. S. R. 23, Sections (1.43-3.74), Pickaway and Circleville Twps., Pickaway Co.;

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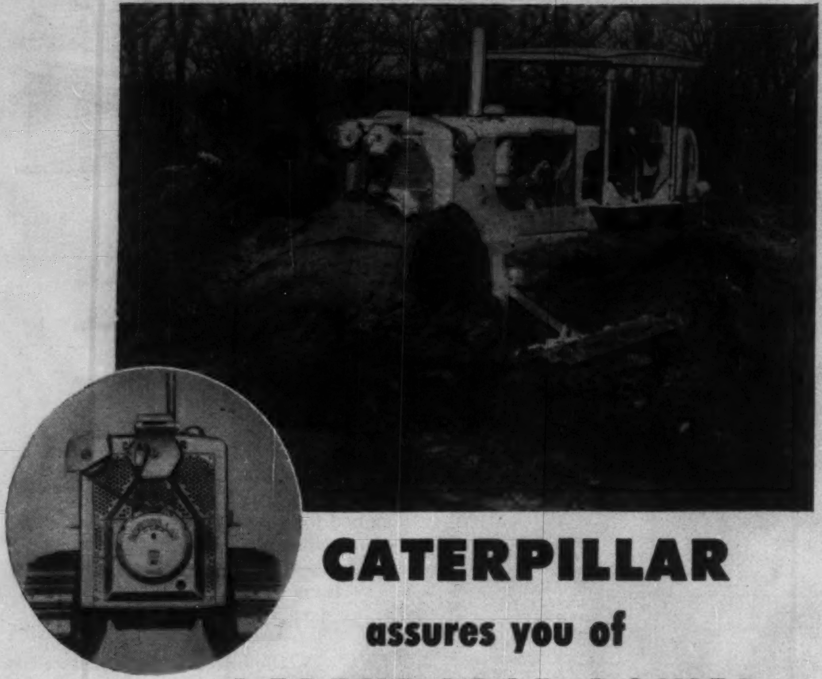
New Orleans - Memphis



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O.—L. R. Skelton, 38 Powhatan Ave., Columbus, O. CA **$1,115,468.**, est. $1,178,000. Type T-35 on B-119 and structure 7.742 mi. U. S. R. 22, sections 0.00, 6.83, Reading, Hopewell and Madison Twps., and Newton Twp., Muskingum and Perry Counties;

O.—**Chapin & Chapin, Inc.**, Rte. 20, East, Norwalk, O. CA **$518,346.**, est. $544,400. Type T-35 and structures 4.66 mi., S. R. 18, Sections (2.44-4.70) Litchfield and York Twps., Medina Co. Grand total $6,165,462. CD 9/22, under LB.

▲ **Michigan Consolidated Gas Co.**, 415 Clifford St., Detroit 26, Mich. Owner Builds. **$22,100,000.** underground gas storage reservoir natural gas, Six Lakes Field, Mount Pleasant, MICHIGAN.

BUILDINGS—LB & CA

▲ **E. F. Ireland & Co.**, Traction Bldg., Cincinnati, O. Owner Builds. **$1,650,000.** 96 prefab., 24x38 ft. bsmnt., bsmntless HOMES, off Mantel and Wicklow Aves., CINCINNATI,O. Nunlist & Frolicher, Traction Bldg., Cincinnati, O., engrs. Thyer Mfg. Co., 2857 Wayne St., Toledo, O., archts. Awarded Sept. 27.

▲ **Sam W. Emerson Co.**, 1836 Euclid Ave., Cleveland, 15, O., CA, Est. **$1,750,000.** general contract 96,000 sq. ft. PLANT, 17-acre site on W. 56 St. south of Denison Ave. Plant, CLEVELAND, O. Dobeckmun Co., 3301 Monroe St., Cleveland, O. CD 7/14. Awarded Sept. 12.

▲ **Anton Kresse**, 4732 Anderson Rd., Cleveland 24, O. Own Forces. **$1,750,000.** 80 HOMES, Professor Rd. located on boundary of South Euclid and Lyndhurst, LYNDHURST, O.

▲ **Modern Home Building Co.**, Barney Schwarzer, pres., 4373 Clague Rd. N., Olmsted, O. Owner Builds. **$1,400,000.** 70 HOMES, W. 226, 227, 228, 229 Sts. off Maple Dr., PARKVIEW, O. CD 9/12.

▲ **Scheik-Johnson Constr. Co.**, 12440 S. Michigan St., Chicago, Ill., Own Forces, **$2,900,000.** 200 HOMES, HARVEY, ILL. Nordlie & Co., 11100 S. Michigan St., Chicago, Ill., archts.

▲ **Worsham-Midwest Corp.**, 3557 Peterson Rd., Chicago, Ill., CA, **$4,000,000,** FACTORY addns., incl. several buildings, railroad trackage, concrete paving, etc., KANKAKEE, ILL. A. O. Smith Corp., 3533 North 27 St., Milwaukee, Wis. Quinn & Christiansen, 134 N. La Salle St., Chicago 2, Ill., archts. Awarded Sept. 21. CD 9/20, under CA.

▲ **Baskin & Marcus**, 15951 Tuller St., Detroit 38, Mich. CA Est. **$1,250,000.** Fairfield Lanes Development, brick HOMES, Pardee and Haskell Sts., DEARBORN, MICH. Sun Ranch Homes, Inc., Ecorse, Mich.

▲ **W. E. Wood Co., 4649 Humboldt St., Detroit, Mich.**, CA, **$4,000,000.** SCIENCE and RESEARCH BLDG., Ford Engineering Center, DEARBORN, MICH. Ford Motor Co., 3000 Schaefer St., Dearborn, Mich. Voorhees, Walker, Foley & Smith, 101 Park Ave., New York, N. Y., archts. CD 8/13/54.

▲ **Schurrer Constr., Inc.**, Pontiac, Mich., CA, **$1,250,000.** HIGH SCHOOL, ROCHESTER, MICH. City School Dist., Rochester, Mich. CD 9/16, under LB.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 13 Kansas	October 18, 19 Texas

STREETS AND ROADS

October 13 Kansas	October 18, 19 Texas

▲† **Tex., Texarkana**—AMMUNITION FACILITIES—BA 10/19—U. S. Eng., Box 61, Tulsa 2, Okla., ammunition renovation facilities, Red River Arsenal, Inv. ENG-34-066-56-18. $1,250,000. CD 7/6/51.

▲† **South Dakota**—BA 11/3—U. S. Eng., 1709 Jackson St., Omaha, Neb., constr. spillway earthwork, approx. 7,650,000 cu. yd. excav. and wasting, Stage I, Oahe Reservoir Proj. near Pierre, CIVENG-25-066-56-41. Total appropriation $25,000,000. CD 9/28.

BUILDINGS—BA

▲ **Tex., Fort Worth** — PLANT — Bids Asked — Menasco Mfg. Co., 805 S. San Fernando Blvd., Burbank, Calif., aircraft mfg. plant, $4,000,000; water sys., $65,000; plant site area earthwork, grading, open drainage, $75,000, at Euless, near here. CD 8/12.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., 1246 University Ave., St. Paul,

L. G. Arnold, Inc., Box 228, Eau Claire, Wis. LB **$1,298,000.** (10 bidders) constr. Bridge No. 6748 over Mississippi River in St. Cloud, Bids Sept. 23.

▲† **Mobray & Son**, Minot, N. D., LB **$1,343,950**, central heating plant, high temperature hot water distr. Inv. 25-066-56-3, Minot Air Force Base, MINOT, N. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Former low bid rejected, LB **$1,342,630**. CD 9/28, under LB.

▲ **Continental Oil Co.**, Ponca City, Okla. LB **$1,168,874**, est. $1,250,000, concession stand over turnpike at Vinita, Craig Co.; LB **$321,960**, est. $300,000. concession stand, restaurant and filling station on turnpike at Miami, Ottawa Co.; LB **$322,172**, est. $350,000, concession station, filling station and restaurant on turnpike at Claremore, Rogers Co., OKLAHOMA. Oklahoma Turnpike Auth., 321 N.E. 24 St., Oklahoma City, Okla. Bids Sept. 20. CD 8/30.

▲ **TEXAS**—State Hy. Comn., Austin,

Whittle Constr. Co., P. O. Box 5602, Dallas, Tex., CA **$1,269,268**, 1.373 mi. Pecos River Bridge and ap-

(Continued on page 94)

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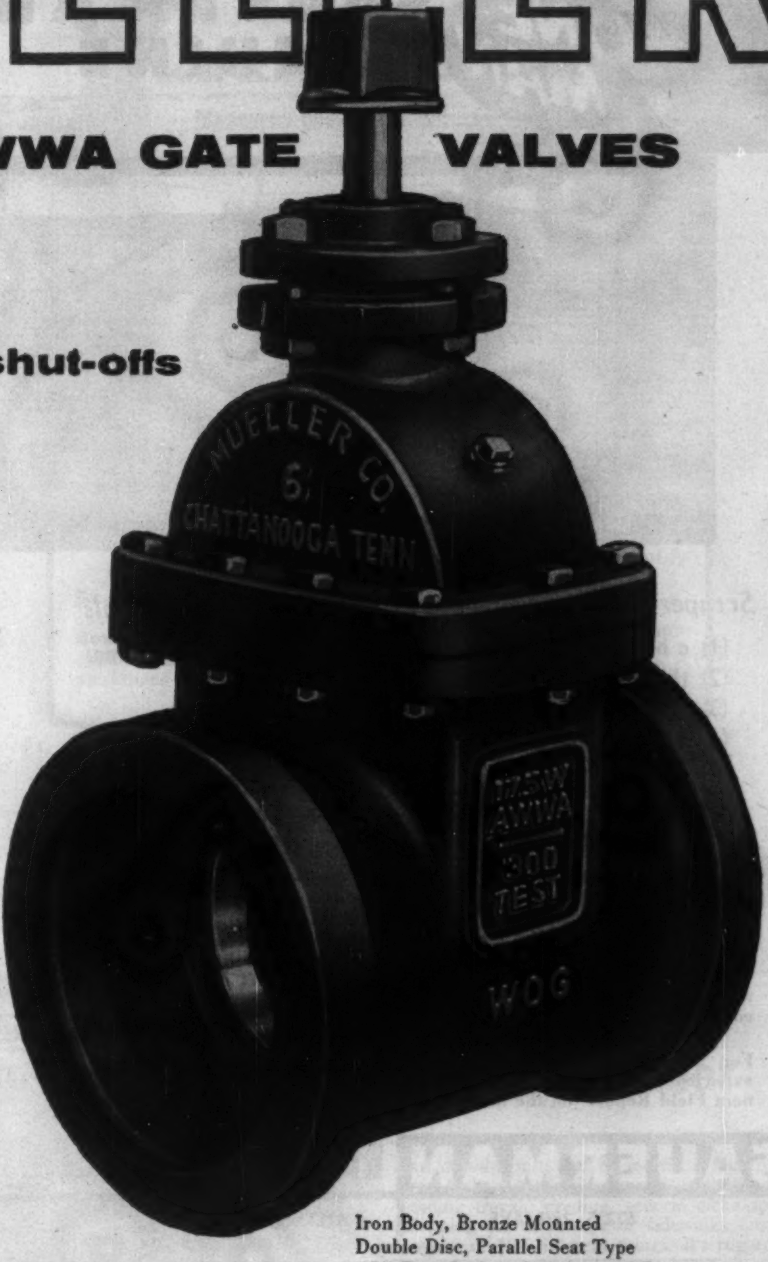

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(Continued from page 92)

proach, Hy. US 90, Proj. ER-14 (1), Val Verde Co. Bids Sept. 14, awarded Sept. 19. CD 9/20, under LB.

▲ **TEXAS**—State Hy. Comn., Austin,
Tex.—**W. R. Aldrich & Co.**, P. O. Box 1751, Baton Rouge, La., CA **$1,233,821**, grading, structures 6.946 mi. Hy. ST. 73, Proj. IN 1052 (28), Chambers Co.;
Tex.—**Collins Constr. Co. of Texas**, P. O. Box 1192, Austin, Tex., CA **$711,403**, flexible base, b. conc. 7.897 mi. Hy. US 80, Proj. F 19 (14), etc., Eastland Co.;
Tex.—**Ivan Dement**, P. O. Box 1787, Amarillo, Tex., CA **$810,112**, flexible base, hot mix b. conc. 17.947 mi. Hy. US 83, Proj. F 581 (11), Jones Co.;
Tex.—**John G. Holland**, P. O. Box 14097, Houston, Tex. CA **$688,130**, deepwater-port storm sewerage sys. Hy. ST 73, Proj. UI 1052 (27), Harris Co. Grand total $3,443,466. Bids Sept. 14, awarded Sept. 19. CD 9/20, under LB.

▲ **TEXAS**—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,
Spencer Constr. Co., Carrollton, Tex., CA **$1,680,062**, grading, drainage 10.22 mi. from 0.5 mi. west of Ederville Rd. to 0.3 mi. west of Duncan-Perry Rd. Contr. D-FW23, Tarrant Co. Bids Sept. 14. CD 9/16, under LB.

▲ **TEXAS**—Texas Turnpike Auth., 214 First Federal Savings Bldg., Austin, Zone 1,
Austin Road & Bridge Co., 1000 Singleton Blvd., Dallas, Tex., CA **$1,856,822**, Trinity River Bridge, Beckley Ave. grade separation and approach grading, Proj. D-FW24, Dallas Co. Bids Sept. 13. CD 9/20, under LB.

BUILDINGS—LB & CA

▲ **Thomas Constr. Co.**, Schneider Bldg., St. Joseph, Mo., LB, **$1,380,495** general contract, LINDEN HALL, Iowa State College, AMES, IOWA. State Bd. Educ., State Office Bldg., Des Moines, Iowa. Bids Sept. 2. CD 8/17.

▲ **Sherbrook Constr. Co.**, 6149 Louisiana Ave., St. Louis 11, Mo. Owner Builds, **$1,285,056.** ninety-seven 1 story, brick RESIDENCES, Rutherford Dr., Meredith, Union, Fabian and Ripa Aves., AFFTON (ST. LOUIS 23 P.O.), MO.

▲ **A. Borchman & Sons**, 4601 Douglas St., Omaha, Neb., CA, **$1,281,887**, general contract MEDICAL OFFICE, 44, and Farnam Sts., OMAHA, NEB., World Publishing Co., 14 and Dodge Sts., Omaha, Neb. Bids Aug. 2. CD 8/24, under LB;
Wray M. Scott Co., 2811 Dodge St., Omaha, Neb., CA, **$631,370.** mechanical work (Omaha, Neb.).

▲ **Farnsworth & Chambers Co., Inc.**, Box 74, Houston, Tex. CA **$7,500,000**, POLYETHYLENE PLANT; CA **$48,000**, water sys.; CA **$85,000**, sanitary-storm sewers; CA **$50,000**, grading, open drainage, grounds development; CA **$75,000**, pipe line work in area on Houston Ship Channel, HOUSTON, TEX. Grand total $7,758,000. Phillips Chemical Co. (subsidiary of Phillips Petroleum Co.), City Natl. Bang Bldg., Houston, Tex. CD 4/22/54.

▲ **T. W. Anderson & Co.**, 1845 Sherman St., Denver, Colo. Owner Builds. **$10,000,000.** HOUSING, incl. 1,000 residences, schools and park development, between S. Broadway and S. Holly St. Orchard Ave. and Douglas Co. line, near DENVER, COLO.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

October 14, 19, 26 California   October 18 Washington

STREETS AND ROADS

October 14, 20, 27 California   October 18 Washington

▲ **Calif., San Francisco**—BA 10/17—City and County of San Francisco P. Utilities Comn., City Hall, water tunnel, excav. in conjunction with Sunset and Crystal Springs water lines, Hillsborough, $1,500,000. Plans deposit $20. CD 2/5/45.

BUILDINGS—BA

▲ **Calif., Hayward**—COUNTY OFFICE—BA 10/18—Alameda County, Court House, Oakland, H-type 2 story, wood, steel frame, county office, Winton Ave. and Eastshore Hy. $1,400,000. Plans deposit $50. Edward D. Cerruti, 1440 Broadway, Oakland, archt. CD 5/27.

▲ **Calif., San Francisco**—SCHOOL—BA 11/2—Dpt. P. Wks., City Hall, Luther Burbank Junior High School. $3,134,000. Plans deposit $100. Extended date. Gardner Dailey, 442 Post St., San Francisco, archt. H. J. Brunnier, 608 Sharon Bldg., engr. CD 9/9.

HEAVY CONSTRUCTION—LB & CA

▲ **Engineers Ltd. Pipeline Co.**, 200 Bush St., San Francisco, Calif., CA Est. **$2,000,000**, 82 mi. 10 in. loops west from Red Wash Field, Uintah Co. to Wolf Creek Pass in Wasatch Mountains east of Salt Lake City, UTAH. Salt Lake Pipe Line Co. (subsidiary) Standard Oil Co. of Calif., 225 Bush St., San Francisco, Calif. CD 8/24.

▲ **OREGON**—State Hy. Comn., Highway Bldg., Salem,
Ore.—**Rogers Constr. Co.**, 11760 N.E. Glisan St., Portland, Ore., CA **$903,281** (14 bidders) grading 9.75 mi. Old Oregon Trail Hy. FAP IN-FI-62 (7), Umatilla and Union Counties; CA **$1,120,067**, (11 bidders) grading 0.4 mi., paving 18.8 mi. Old Oregon Trail Hy. FAP IN-FI-67 (5), Malheur Co.;
Ore.—**Babler Bros., Inc.**, 4617 S.E. Milwaukie St., Portland, Ore., CA **$99,163**, (17 bidders) grading 4.43 mi. Willamina-Salem Hy. FAP F-325 (1), Polk Co.;

Ore.—Porter W. Yett, 6500 N.E. Ainsworth St., Portland, Ore., CA **$304,741** (3 bidders) grading, paving 2.24 mi. Beaverton-Hillsdale Hy. FAP S-198 (3) and US-198 (4), Multnomah Co.; CA **$75,315** (4 bidders) paving 4.63 mi. North River County Rd., FAP S-45 (3), Marion Co.;

Ore.—T. W. Thomas, 10248 N.E. Holladay St., Portland, Ore. CA **$200,792** (8 bidders) grading, paving 4.51 mi., 133 ft. concrete bridge, Central Oregon Hy., FAP F-326 (1) Malheur Co. Grand total $2,703,359. Bids Sept. 22. Awarded Sept. 22. CD 9/14.

▲ **CALIFORNIA**—State Div. Hys., 1120 N. St., Sacramento.

Peter Kiewit Sons' Co., 442 Post St., San Francisco, Calif., CA, **$4,275,510**, grading, paving 5.4 mi. freeway and expressway on Hy. 50 and 10 bridges in Oakland, Alameda Co. Bids Sept. 14. CD 9/16, under LB.

▲ **CALIFORNIA**—State Div. Hys., P. Wks. Bldg., Sacramento,

Calif.—**Gordon H. Ball**, 300 Camille Ave., Danville, Calif., LB **$3,052,569** (9 bidders) four-lane divided freeway 2.6 mi. State Sign Route 24 incl. 6 grade separation structures, Contra Costa Co.;

Calif.—**Madonna Constr. Co.**, P. O. Box 910, San Luis Obispo, Calif., LB, **$1,663,127**, (12 bidders) two addnl. lanes U. S. 101 north of Los Almos and south of Santa Maria to provide a four-lane divided expressway, Santa Barbara Co. Bids Sept. 28. CD 9/1.

BUILDINGS—LB & CA

▲ **Bayshore Constr. Co.**, 744 Flager Ave., Berkeley, Calif. Own Forces, **$6,000,000**, 15 story, rein.-con., steel OFFICE, "Bermuda Bldg.", OAKLAND, CALIF. CD 6/9.

▲ **Bergesen & Tam Constr. Co.**, 535 Merrit Ave., Oakland, Calif. Own Forces. **$6,000,000**. 200-HOME subdivision in Broadview Highlands, OAKLAND, CALIF.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS
October 12 Ontario

BUILDINGS—BA

▲ **N. B., Fredericton** — CLUBS — BA 10/6 — Defence Constr. Ltd., 56 Lyon St., Ottawa, Ont., Four Junior Ranks Club, Contract "M", Army Camp, Camp Gagetown. $1,400,000. Plans deposit $100.

▲ **Que., East Broughton**—MILL, etc.—Bids Asked—Carey Canadian Miles Ltd., East Broughton, mill bldg. and crushing plant, part of mine expansion, Total est. $7,500,000. General Eng. Co. Ltd., 100 Adelaide St. W., Toronto, Ont., engrs.

BUILDINGS—LB & CA

▲ **Burns & Dutton Concrete & Constr. Co., Ltd.**, 9004 125 Ave. Edmonton, Alta., CA **$1,700,000**. 160 HOUSING UNITS, incl. ground services, Griesbach Barracks, EDMONTON, ALTA. Central Mortgage & Housing Corp., 1006 107 St., Edmonton, Alta. Bids Aug. 24, awarded Sept. 15. CD 8/10.

▲ **Dominion Constr. Co., Ltd.**, 195 W. 2 Ave., Vancouver, B. C., CA **$40,000,000**. 180-ton general purpose and board machine and 300-ton newsprint mill, pulp and paper mill addn., PORT ALBERNI, B. C. MacMillan & Bloedel Ltd., Port Alberni, B. C. H. A. Simons Ltd., 16 E. Hastings Vancouver, B. C., engr. Awarded Sept. 15. CD 1/24.

▲ **Marwell Constr. Co., Ltd.**, 1500 W. Georgia St., Vancouver, B. C., CA **$2,000,000**. main branch BANK addn., Hastings and Seymour Sts., VANCOUVER, B. C. Bank of Nova Scotia, Hastings and Seymour Sts., Vancouver, B. C. Awarded Sept. 16. CD 5/11.

▲ **Atlas Constr. Co. Ltd.**, 4781 St. Catherine St. W., Montreal, Que., CA **$2,603,150** (5 bidders) Contract "K", seven 40-vehicle GARAGES, one 50-vehicle GARAGE, three tank hangars, one GUN DRILL and maintenace BLDG., Canadian Army, Camp Gagetown, FREDERICTON, N. B. Defence Constr. (1951) Ltd., 56 Lyon St., Ottawa, Ont. Bids Aug. 5, awarded Sept. 20. CD 7/13.

▲ **Fraser-Brace Eng. Co. (Ontario) Ltd.**, 80 Richmond St. W., Toronto, Ont., CA, **$7,000,000**. general contract commercial explosives PLANT incl. office, services and process units and magazines, West Ferris Twp., about 5 mi. southeast of NORTH BAY, ONT. DuPont Co. of Canada Ltd., Box 660, Montreal, Que. CD 3/11.

▲ **Ted Poole**, 29 Allard Ave., Dorval, Que. Owner Builds, **$2,700,000**. 100-unit HOUSING program in suburb of Dorval, MONTREAL, QUE. Jean Damphousse, 408 Des Prairies Blvd., Laval de Rapides, Que., archt.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **El Salvador**—The Comision Ejecutiva del Puerto de Acajutla (CEPA), Edificio Regalado, 2a Avenida Sur, No. 15, San Salvador, is ready to qualify firms interested in bidding on the Acajutla Port construction project. CEPA plans to give companies until the end of October to qualify. Bids may be called for early in November. Present plans involve constr. of new combination pier and breakwater extending out 466 meters from a rocky promontory. A pier head would be built 296.5 meters long and 37 meters wide. Two warehouses on pier head as well as necessary administration buildings. Est. $4,165,000. CD 11/16/53.

(Proposal Advertisements see pp. 107 to 110)

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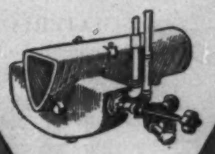

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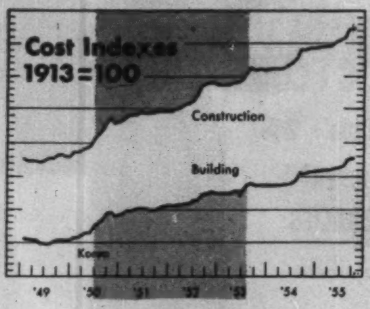
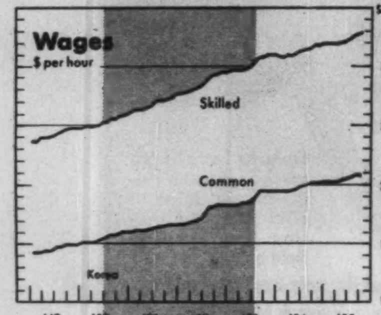
OCTOBER CONSTRUCTION SCOREBOARD

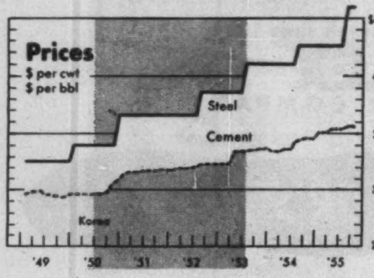


	1955	% Change from last	
ENR INDEXES (1913=100), 20-cities' average	**Oct.**	**Month**	**Year**
Construction Cost	673.95	+0.2	+5.1
Building Cost	480.05	+0.2	+5.4

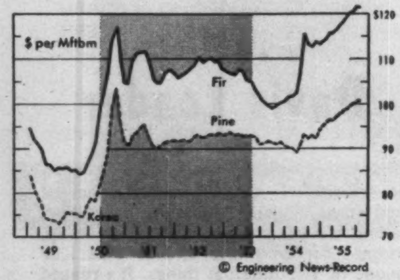
WAGE RATES, 20-cities' average			
Common	$2.093	+0.3	+3.8
Skilled (aver. 3 trades)	3.286	+0.5	+3.3
Bricklayers	3.544	+0.6	+2.6
Structural Ironworkers	3.276	+0.4	+3.9
Carpenters	3.039	+0.4	+3.6



MATERIAL PRICES, 20-cities' average			
Cement, bulk, per bbl	$3.567	0.0	+3.1
Structural Steel, (3-mill aver.), per cwt	4.600	0.0	+8.2
Sand, per ton	2.372	0.0	+5.4
Lumber, 2x4 Fir, per M. ft. bm	121.166	−0.2	+7.3
Lumber, 2x4 Pine, per M. ft. bm	100.800	+0.3	+8.4
Common brick, per M	34.880	+0.9	+4.9
Ready-mixed concrete, per c. y	12.631	+0.2	+3.5
Structural Clay Tile, 3x12x12 per M	163.223	+0.4	+0.7



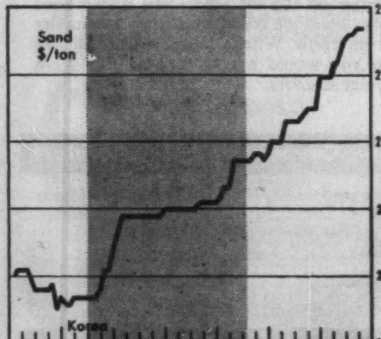
CONTRACTS AWARDED	1955		% Change from '54	
(Millions)	**Sept.**	**9-Months**	**Sept.**	**Months**
Total U. S. (ENR reported)	$1,786.2	$14,134.2	+20.8	+30.5
Private	1,118.3	8,792.0	+37.8	+42.5
Public	667.9	5,342.2	+ 0.1	+14.7
Federal	122.4	1,289.1	+ 8.8	+40.0
ENR Volume Index, '13=100	576	607	+14.5	+25.4
NEW CAPITAL (Millions)				
Total	748.9	10,197.3	+ 1.9	+ 9.9
State & Municipal Bond Sales	323.3	3,160.8	− 38.7	−24.5
Corporate Security Sales	405.9	2,610.9	+109.2	+17.5
Federal (non-federal work)	19.7	961.3	+ 42.8	+25.6
Federal (federal work)	......	3,464.3	....	+64.5

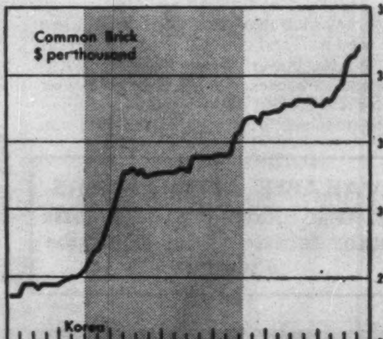


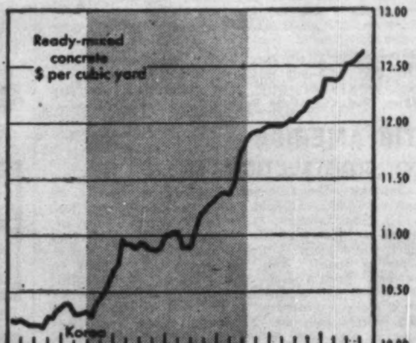
© Engineering News-Record

	1955			
MATERIAL SHIPMENTS &	**July (J)**	**7-Mos.**	**% Change from '54**	
LABOR SUPPLIES (millions)	**Aug. (A)**	**8-Mos.**	**Mo.**	**Yr.-Cum.**
Cement, bbls. Bu. of Mines	29.124(J)	164.273(7)	+ 5.1	+ 9.6
Fabr. Struct. Steel, tons AISC	.267(A)	1.900(8)	− 1.8	−12.0
Lumber, mil. ft. bm., NLMA	3.233(J)	23.240(7)	+13.9	+ 8.8
Lumber Prod., mil. ft. bm., NLMA	3.041(J)	22.463(7)	+11.6	+ 4.5
Contract Const. Employ., BLS	2.729(A)	2.454(8)†	− 0.2	− 1.6

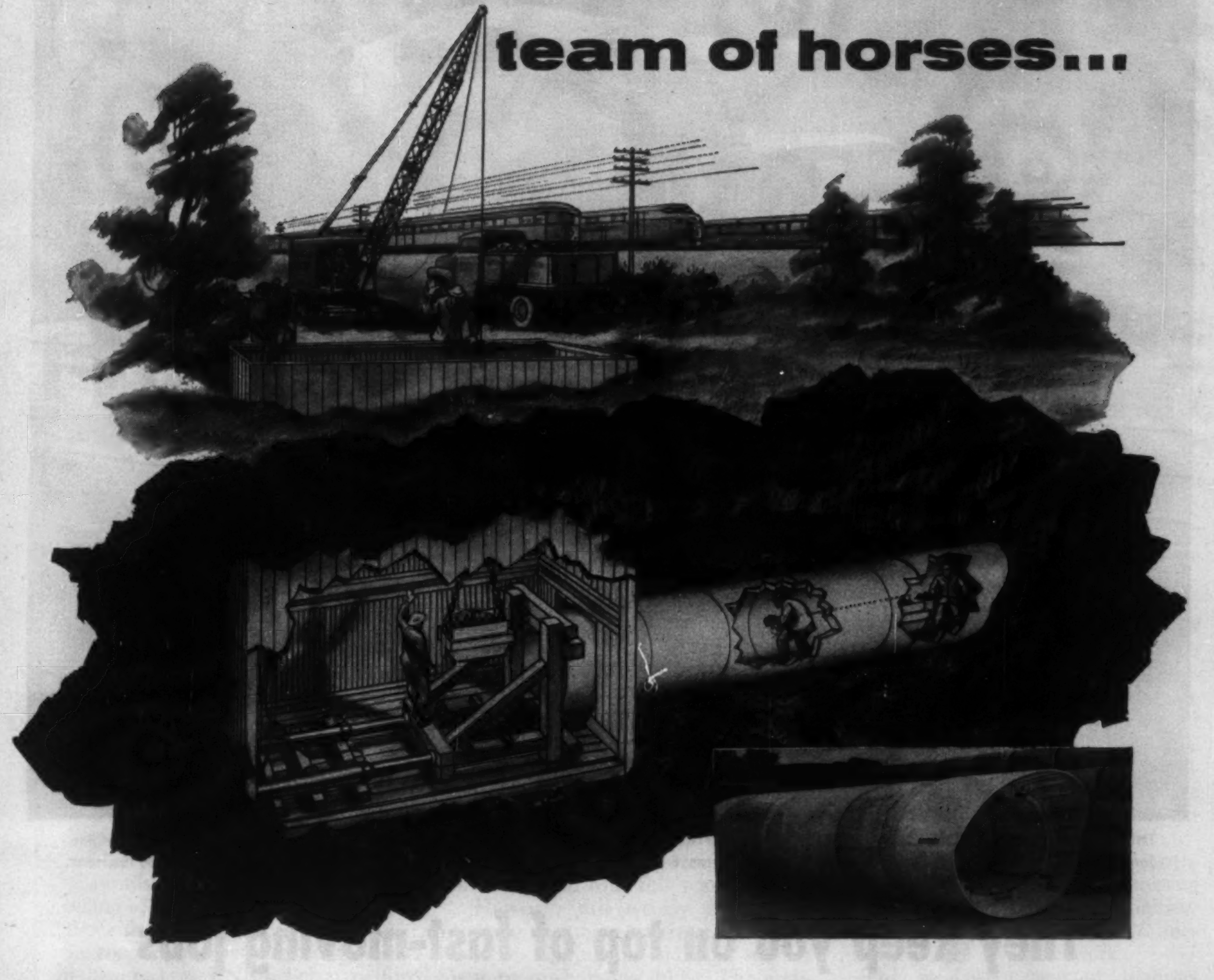
†Average







Easy as driving a team of horses...



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AMRAM Jacking Controls are designed for use with Lo-Hed, Inner Circle and round, reinforced concrete pipe in sizes above 30" internal diameter. Write today for complete information.

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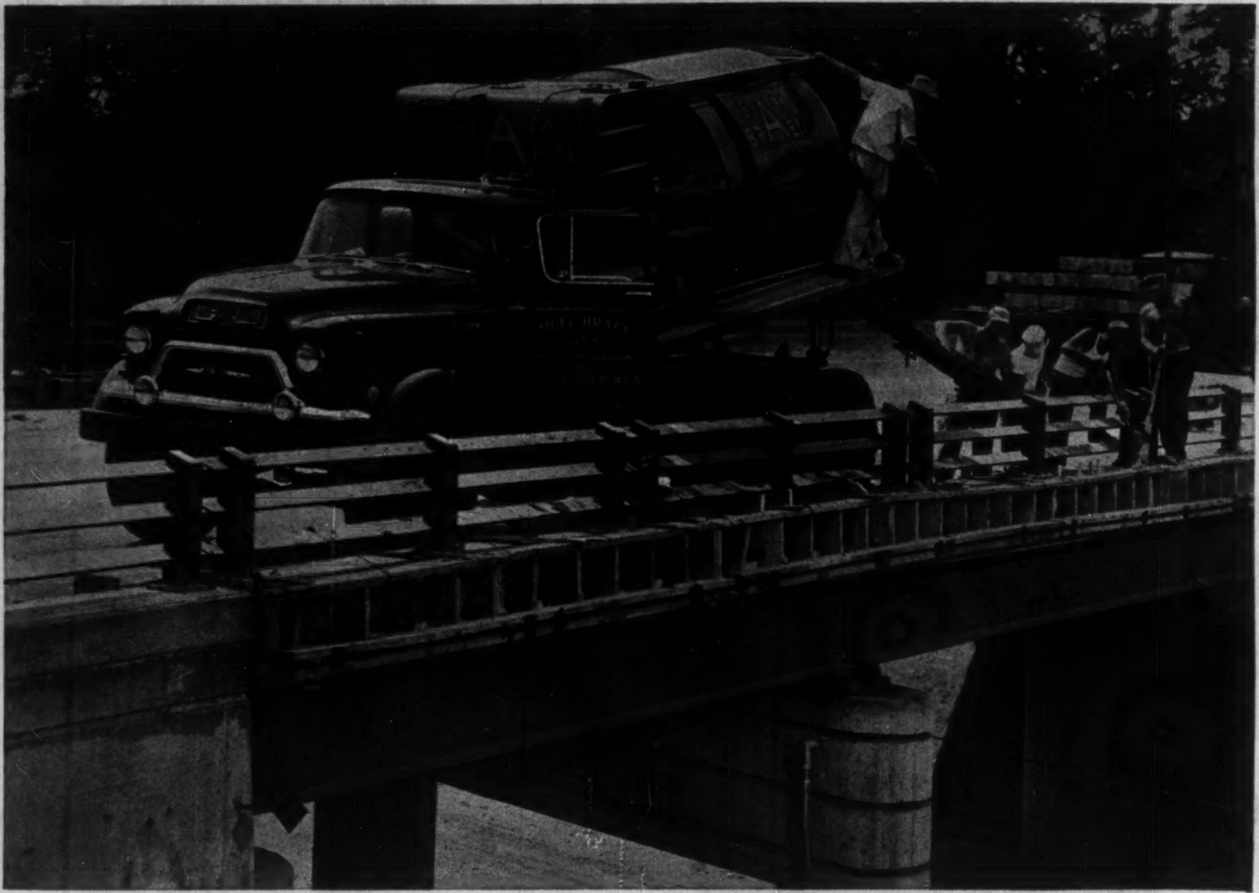

THIS GMC W630-50 IS ONE OF A BIG TEAM that worked New Jersey's Garden State Parkway job. Its power to hustle an 8-yard transit mix comes from GMC's new 225-h.p. Blue Chip gasoline engine. Its extra-capacity axles are rated at 11,000 lbs. front—36,000 lbs. rear.

They keep you on top of fast-moving jobs

EVEN tough, clock-racing jobs like road-building are no problem to contractors using the new GMC Blue Chip tandems.

That's the kind of fast-moving work they're built for. They step along so smartly—swinging top-capacity loads—that you can figure on them for extra trips per day.

New high-torque engines do that. There's a choice of 6—short-stroke sixes, V8's and Diesels. And each one has a horsepower reserve that makes light of the heftiest hauls—pulls you through the roughest going *fast.*

Nine of Them are Hydra-Matic*

You can team this Blue Chip power with money-saving Hydra-Matic in 9 of the models. That's automatic protection against day-after-day punishment that murders ordinary trucks. Manual-shift versions now have big 2-plate 14-inch clutches.

That's the tip-off on their all-over ruggedness. There are massive new frames. *Full-length reinforcements,*** when necessary, are factory-installed. Axles—front and rear—are over-size. Wheels are of a rugged, new design. And Safety Power Steering** makes jockeying—even down in the pit—a snap.

There are 19 of these GMC Blue Chip tandems in all—completely blanketing the 28,000 GVW-70,000 GCW range. Get a complete run-down at your GMC dealer's—now!

**Hydra-Matic standard on many models; optional at extra cost on some others*
***Optional at extra cost*

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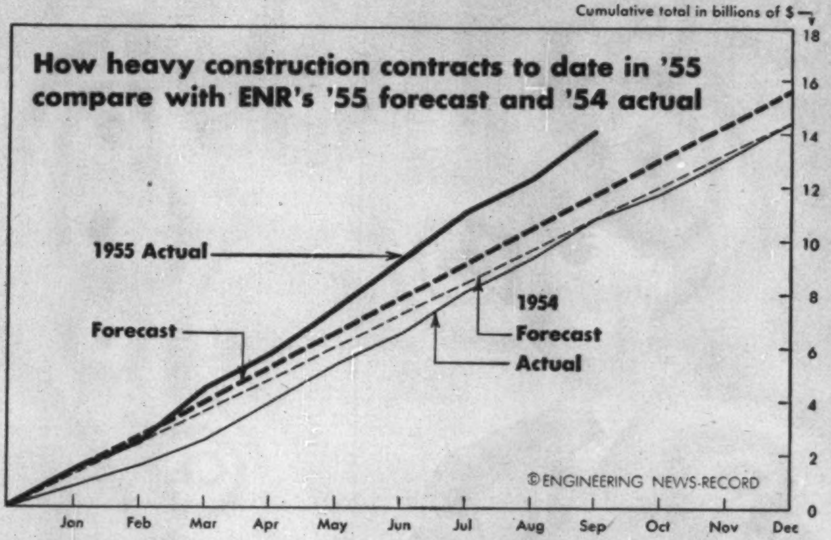

Construction Tempo Picks Up

Construction resumed its boom tempo in September, after slackening a bit in August. Total awards were almost $1.8 billion, a new record for September. On the weekly average basis, awards were 15% ahead of August.

This pushes the nine-months total of awards to an all-time high of $14.1 billion—31% above last year and 15% above the previous record set in 1952. So construction volume continues to pull ahead of ENR's February forecast of a 9% gain this year (see chart above).

• Housing gains—Private work sparked the rise, and in this field housing awards were the star performer. They climbed out of a decline in July and August to rack up a weekly average of $121 million in September. This is about equal to the high June rates, though it's below the record months of March and May this year.

However, this weekly average for housing contracts is a record for September, topping the old high set last year by a whopping 40%. This indicates that the housing boom hasn't yet shot its bolt, though awards in coming months are not expected to reach higher levels.

Private unclassified awards were another big factor in the September boom. This was largely accounted for by a $110-million contract for a gas pipeline from Baton Rouge to Miami being built by Midwest Constructors, Inc., of Tulsa, for Houston Gas & Oil Corp., of Houston.

Commercial building recovered from its August skid. But volume, at a weekly average of $28.3 million, was off 14% from September of last year and was below the high levels of May and June.

Industrial building declined for the second consecutive month, with a weekly average of $43.4 million. However, this was 22% above September 1954, and was the second best September on record.

• Public works—Federal awards climbed a little, while state and local contracts held steady. Federal contracts averaged $24.4 million, up from the August low but still the second lowest month so far this year. State and municipal awards averaged $109 million per week, an eyelash below the September record for this category set last year.

Sharp increases in sewerage, earthwork & waterways, and public housing joined with small increases in highway and bridge contracts to offset declines in other types of public work.

The weekly average of highway awards was the second highest for any

(*Continued on page 102*)

ENGINEERING CONSTRUCTION CONTRACTS—SEPTEMBER 1955

ENGINEERING NEWS-RECORD *reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation,* $44,000; *other public works,* $73,000; *industrial buildings,* $93,000; *other buildings,* $344,000

Five Weeks—Thousands of Dollars (000 omitted)

	September, 1955							U. S. Cumulative Nine Months		% Change	Canada September
	New England	Middle Atlantic	South	Mid-West	West of Mississippi	Far West	Total U. S.	1955	1954	'54 to '55	1955
Public Works											
Waterworks	377	3,035	2,390	8,660	11,519	1,347	**27,328**	**205,061**	175,013	+17	5,334
Sewerage	2,296	20,762	2,336	7,217	8,205	7,337	**48,153**	**300,936**	281,845	+ 7	7,337
Bridges	6,022	9,569	10,059	6,472	11,983	3,397	**47,502**	**357,081**	382,802	− 7	1,893
Earthwork and waterways	544	16,257	26,940	446	14,223	9,738	**68,148**	**406,647**	207,172	+96	14,440
Streets and roads	11,739	75,796	42,213	28,421	61,911	14,302	**234,382**	**1,662,296**	1,443,419	+15	16,431
Public buildings, residential	543	29,705	3,203	1,345	2,370	....	**37,166**	**220,318**	182,847	+20	14,067
Other public buildings	17,632	42,463	14,542	25,075	26,682	23,751	**150,145**	**1,311,572**	1,323,774	− 1	19,981
Unclassified	5,006	20,814	5,004	2,448	16,278	5,492	**55,042**	**878,241**	662,531	+33	10,227
Total public	**44,159**	**218,401**	**106,687**	**80,084**	**153,171**	**65,364**	**667,866**	**5,342,152**	**4,659,403**	+15	**89,710**
Federal government (included in above classifications)	4,934	30,026	34,876	2,478	33,520	16,547	**122,381**	**1,289,102**	920,518	+40	31,020
Private											
Bridges	....	....	....	....	121	....	**121**	**1,829**	6,650	−73	....
Industrial buildings	3,705	70,905	17,207	59,662	39,847	25,896	**217,222**	**2,055,192**	1,454,936	+41	21,629
Mass housing	16,760	235,060	2,391	153,188	135,237	60,036	**602,672**	**4,777,739**	3,210,992	+49	24,004
Commercial buildings	2,527	37,439	14,986	33,614	38,281	14,691	**141,538**	**1,272,740**	1,014,231	+26	10,369
Unclassified	100	4,618	110,730	5,337	35,302	693	**156,780**	**684,519**	481,972	+42	1,249
Total private	**23,092**	**348,022**	**145,314**	**251,801**	**248,788**	**101,316**	**1,118,333**	**8,792,019**	**6,168,781**	**+43**	**57,251**
Total Engineering Construction:											
September, 1955—5 weeks	**67,251**	**566,423**	**252,001**	**331,885**	**401,959**	**166,680**	**1,786,199**	....	....	....	**146,961**
August, 1955—4 weeks	58,515	176,498	111,674	402,721	359,313	130,947	**1,239,668**	....	....	....	132,238
September, 1954—5 weeks	81,656	359,878	267,070	293,165	329,952	146,832	**1,478,553**	....	....	....	135,937
Nine Months—1955	**676,815**	**3,954,746**	**1,540,648**	**3,109,125**	**3,296,703**	**1,556,134**	....	**14,134,171**	....	**+31**	**1,266,545**
Nine Months—1954	575,624	2,791,479	1,480,137	2,233,858	2,472,237	1,274.849	....	....	10,828,184	....	1,289,412
% Change '54 to '55	+18	+42	+5	+39	+33	+22	....	....	....	....	−2

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Saves Sales Dollars

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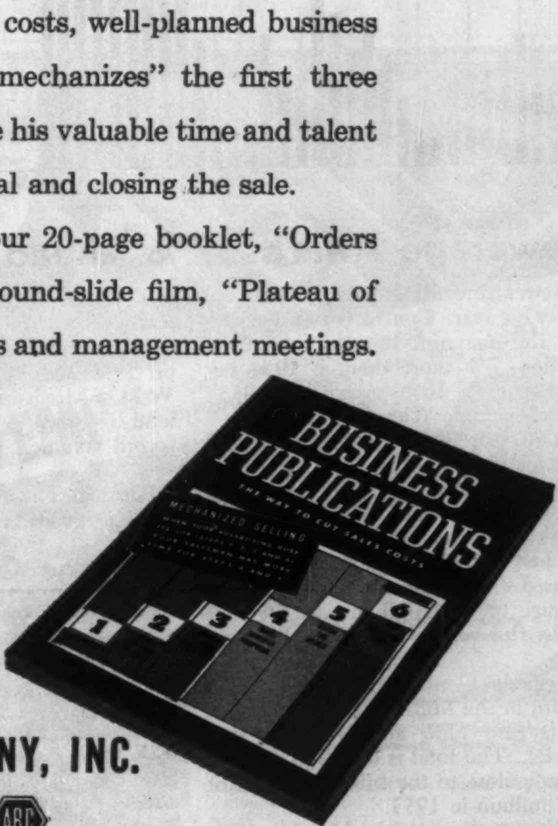
Ask your McGraw-Hill man for a copy of our 20-page booklet, "Orders and How They Grow." Also about our new sound-slide film, "Plateau of Progress" which is available for showing at sales and management meetings.



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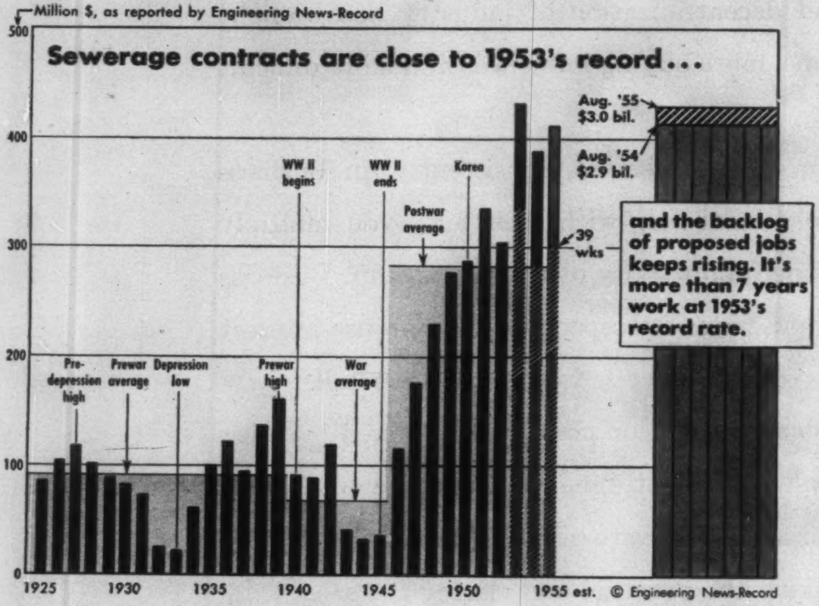
month this year—almost $47 million. Awards for non-residential public buildings declined to $30 million per week, lowest since May. But sewerage contracts were the heaviest so far in 1955. Waterworks dipped again in September, but volume tops last year for the fourth consecutive month.

• **Regions**—The Mid-Atlantic had its third biggest month in history. The weekly average was $113 million. This surge followed a very sharp drop in August. So far this year, this region has had the biggest gain of any area.

Contract volume was up sharply in the South. For the year to date, contracts in the South are up 5%. That's by far the smallest gain for any region.

September volume was lower than August in all other regions except for the Far West, where it held steady on the basis of the weekly average. However, volume for the year so far is running well ahead of last year in all these areas.



Sewerage Awards: 7% Ahead of 1954

Sewerage contractors are having another big year. Contracts awarded during the first nine months total $301 million, 7% more than in 1954 but second by a 10% margin to 1953's record volume (chart).

This year started out with a record first quarter of $95 million. And business has continued to roll up an impressive total which should bring the year's volume close to ENR's February forecast of $410 million. Awards increased sharply last month. The weekly average of $9.6 million was the best so far this year.

• **Regions**—Contracts are headed for a record in the Mid-West, where awards so far are 17% ahead of last year (table). The total is over $80 million, already close to the full-year record of $85 million in 1953.

Biggest gain is in the Mid-Atlantic—37% over the same period last year. But the total is running far behind the record set in 1953. The Far West is 17% ahead so far over 1954, which was a record full year.

By contrast, sewerage contracts are off 13% and 14% in the South and West-of-Mississippi, while New England is down 34% from last year's record volume.

• **Backlog**—The outlook for future business is good because of the record backlog of proposed projects (table). The total backlog at the end of August was nearly $3 billion—seven years' work at 1953's record rate. The backlog has been growing more slowly since 1953, but it is still rising in spite of the heavy volume of contract awards in the past three years.

The 1% gain in the total backlog over the past twelve months has come from a 12% climb in the Far West (table), plus small gains in the Mid-West and West-of-Mississippi. Backlogs in other regions have declined slightly.

States with the biggest backlogs are: California, $394 million; New York, $352 million; Ohio, $292 million; Texas, $238 million; Michigan, $219 million; Illinois, $156 million; and Pennsylvania, $152 million. These seven states account for 61% of sewerage projects in the planning stage.

Sewerage Contract Awards and Backlog by Regions

As reported by Engineering News-Record

Region	Contract awards, first 9 months '55 Volume (millions)	 % chg. '54-'55	Backlog of proposed projects, Aug. 31, '55 Estimated cost in millions	 % chg. Aug. '54-Aug. '55
U. S. total	**$300.9**	+7	**$2,974**	+1
New England	14.5	−34	138	−5
Middle Atlantic	77.3	+37	592	−3
South	32.8	−13	399	−4
Middle West	80.4	+17	776	+3
West of Mississippi	51.8	−14	558	+1
Far West	44.1	+17	511	+12

Wage Boosts Push Up Indexes Slightly to New Record Highs

Both of ENR's cost indexes crept up only 0.2% in the past month but reached new record highs for October. This is the second straight month that costs have been practically unchanged.

The Construction Cost Index is 673.95, based on 1913=100. This is a gain of 5.1% in a year. The Building Cost Index is 480.05, also based on 1913=100. It is 5.4% higher than a year ago.

Scattered wage increases for skilled workers in five cities more than offset a mild dip in lumber prices. Douglas fir 2x4s declined from $1 to $5 per Mftbm in four cities, while they rose in two cities. This brought the first decline since September 1954 in the ENR fir price average. Pine 2x4s rose in four cities, dropped in two others.

The wage increases took place in Birmingham, Chicago, Denver, Los Angeles, and Pittsburgh. Nearly all of them were 10 cents per hour or less.

(B&F continued on page 104)

Richmond-Petersburg Pike Bonds Sell Like Hot Cakes

As everyone expected, financing of the $69-million Richmond-Petersburg turnpike was a smashing success. Underwriters bought the bonds last week from the Turnpike Authority, and were able to resell them immediately. Original buyers were soon offering the bonds at a premium of ¾ of a point above the original offering price.

However, the authority is paying a net interest cost of 3.50%. That is not high, but it is a considerable jump from the 2.93% cost of the Dallas-Fort Worth borrowing in June (ENR June 23, p. 78).

Of course, every turnpike is a separate proposition that must be studied on its own merits. But the wide difference between the last two turnpike financings suggests that the private Dallas-Houston bond issue and the huge Illinois Turnpike offering might have to pay stiff rates if they are brought on the market this month, as planned.

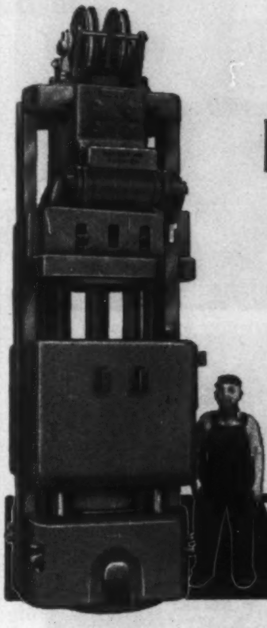
The Richmond-Petersburg pike will be a "bridge" highway between two cities, and in addition can expect a sizable volume of through traffic. The 35-mi highway is expected to open in April 1958. Traffic engineers figure that by 1960 debt service will be covered 1.47 times, and that the whole issue can be paid by 1978.

Higher Prices and Rentals On Construction Equipment

Prices of construction equipment rose about 1% in August alone, the biggest rise for a single month shown since July 1953. That's the story told by the construction machinery price index, just released by the Bureau of Labor Statistics. It shows prices are at a record high.

Rental rates on construction equipment have climbed faster than prices of new rigs. A compilation made by Associated Equipment Distributors, for informational purposes only, shows the average rates this year for many items are up 10% to 25% over 1953. (For further details, see ENR's Cost Issue, Sept. 29, p. 222.) This compares with an average 4.2% increase in manufacturers' prices between August 1953 and last August, as shown by the BLS index. The climb was 3.4% in the past year alone.

Sharpest price increases have come in power cranes and shovels, up 6.7% over August 1954; portable air compressors, up 6.4%, and mixers and pavers, up 5.5%. There were smaller increases in scrapers and graders (up 1.7%), and tractors (up 1.6%). Machinery for mounting on tractors rose 0.7%.



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BUSINESS AND FINANCE

Austin Building Price Index Makes Biggest Jump Since '50

The price index of industrial building construction kept by Cleveland's Austin Co. moved up sharply for the third quarter. The index moved from 195 to 199, the biggest gain since 1950. This accounts for half of the 4.2% gain in the past 12 months.

Austin's president, George Bryant, says the rise reflects higher costs of labor and materials, particularly steel and copper. He warns material shortages will get worse if building continues at its present high level.

Business Briefs . . .

- **Cement goes up**—Several producers have raised prices of cement for the fourth quarter. Boosts range from 10 cents to 25 cents a barrel. The raises come at plants in the Buffalo area, in Ohio, and in Florida.

- **Dravo Corp.**, of Pittsburgh, plans to make and sell prefabricated heliports through an arrangement with Standard Heliports, Inc., of Minneapolis.

- **Auto plants**—Chrysler Corp. will start an $85-million plant between Cleveland and Akron. Ford announces it will spend $500 million for construction and equipment in 1956, including many projects already announced.

- **Tire plants**—Goodyear plans to spend $100 million for plant and equipment in the next two years. U.S. Rubber will spend $30 million through next year. Firestone plans a big butadiene plant.

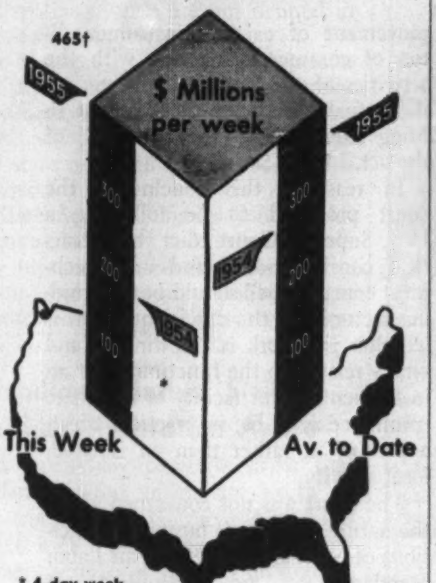
- **Structural steel** bookings ran over 300,000 tons for the fourth straight month, according to the American Institute of Steel Construction. But shipments are still running below last year. Bookings for the first eight months total over 2.3 million tons, up 37%, while shipments total 1.9 million, down 12%. The total backlog at the end of August was 1¾ million tons.

- **Southern Bell Telephone Co.** will spend $240 million on plant and equipment this year and $250 million in 1956, compared with $188 million last year.

- **Savings banks** bought $225 million of mortgages in August, according to the National Assn. of Mutual Savings Banks. This was the only type of investment in which they increased their holdings. Their mortgages now total over $16.4 billion, 53.4% of assets.

Activity This Week

As reported to ENR
(In millions of dollars)



* 4-day week
† 6-day week

Amount of contracts let

(millions of dollars)

	This Week†	Cumulative 40 wks 1955	1954	% chge
By Ownership				
Federal	$12.3	$1,301.4	$950.7	+37
State and municipal ...	122.1	4,175.1	3,809.0	+10
Total public....	134.4	5,476.5	4,759.7	+15
Total private...	330.1	9,122.2	6,261.4	+46
U. S. Total....	$464.5	$14,598.7	$11,021.1	+32
By type of work				
Waterworks	$2.4	$207.5	$185.0	+12
Sewerage	10.5	311.5	285.5	+9
Bridges	23.2	382.0	394.7	−3
Highways	54.1	1,716.2	1,473.7	+16
Earthwork, waterways ...	2.8	409.3	223.0	+84
Buildings:				
Public, excl. housing ..	27.4	1,339.1	1,349.7	−1
Public housg..	..	220.5	184.7	+19
Private housg.	158.7	4,936.4	3,282.1	+50
Commercial ..	26.3	1,229.0	1,019.2	+21
Industrial ...	119.1	2,174.3	1,466.0	+48
Unclassified	40.0	1,602.9	1,157.5	+38
U. S. Total.....	$464.5	$14,598.7	$11,021.1	+32

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.
† 6-day week

New capital for construction

(millions of dollars)

	Week of Sept. 29	Cumulative 39 Wks 1955	% Chge '54-'55
Corporate securities	$112.2	$2,610.9	+18
State and municipal:			
All except housing.....	92.9	3,088.8	−25
Housing	...	72.0	−21
Federal loans	3.2	107.9	+17
Federal aid	...	853.5	+27
Total nonfederal	$208.4	$6,733.0	−6
Federal appropriations:			
In U. S.............	...	$3,379.7	+63
Outside U. S..........	...	84.6	+155
Total new capital........	$208.4	$10,197.3	+10

ENR cost and volume indexes, 1955

Base years = 100

		1913	1926	1949
Construction cost ...	9/29†	673.95	323.97	141.28
	9/1†	672.80	323.41	141.04
Building cost	9/29†	480.05	259.50	136.46
	9/1†	479.21	259.05	136.22
Volume	Sept.	576	234	166
	Aug.	508	207	147

† Official ENR Indxees for Sept. & Oct.

Darex Diary

No. 6 of a series

by Henry L. Kennedy

Member, American Concrete Institute

Manager, Construction Products
Dewey & Almy Chemical Company

****A look at new techniques and developments in concrete construction.***

Frequently I wonder if we are all fully aware of the tremendous amount of research and development that is being directed toward improvements in concrete construction. I was reminded of this when I reviewed some typical examples of this activity that my staff and I have encountered recently in our travels throughout the United States.

As an illustration, consider the mortar air meter that has been developed and is under final test during construction of the power features of the St. Lawrence Seaway Project. This apparatus, which is intended to measure directly the air content of the mortar in concrete by pressure method, was designed and will be tested by its originator, who is Concrete Engineer for the project. It is pretty generally agreed that it is the air content of the mortar, and not of the concrete, that counts as far as durability is concerned; and if the mortar meter performs as the designer intends (there is good reason to indicate that it will) this will be one more step toward advancing the technology of concrete.

Engineers in the Illinois Highway Department have developed a technique to measure the air content of hardened concrete by pressure methods. Employing a hydraulic ram and pressures up to 5000 psi., the air content is measured by recording the amount of water that is forced into the voids in the concrete. As with the linear traverse method—whereby the voids in air entrained concrete are determined by actual count—the high pressure air meter provides another and much speedier means to evaluate hardened concrete in a post-construction investigation.

Continued research and investigation in the field of concrete control is evidenced by the work that has been done in recent years toward development of the "ball" penetration test to measure concrete consistency. The ball test is simple to perform and has the advantage of permitting fast consistency determinations to be made "in place", without disturbing the concrete. This feature is helpful in spotting segregation and premature stiffening and also allows consistency checks to be made at any point in the concreting operation. The results of participating and cooperative effort on the part of a large ready mix producer on the West Coast, several state highway departments, the Corps of Engineers, and the University of California are manifested in the recent adoption of the method as a tentative standard by ASTM.

There are many, many other instances that I could cite, but space permits only brief mention of a few: (1) An electronic indicator for DAREX AEA dispensers has just been developed by our distributor in Illinois. The instrument is a visual aid to the batch operator that tells him by an indicator light that the DAREX AEA has been properly dispensed into the mixer. (2) Our DAREX AEA distributor for Kentucky is working closely with state highway officials in that state conducting tests to develop optimum field techniques to restore badly eroded concrete bridge decks. DARAWELD is used as the agent to bond the overlay to the old concrete. (3) Our distributor for the northwest is improving a DAREX AEA dispenser for paving mixers that they developed a few years ago. All along the line,—our Dewey and Almy technical research staff, sales personnel, and manufacturing people—join with engineers and contractors in the search for improvements in techniques and apparatus used in the field of concrete construction. Is there a project we should be working on with you?

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Engineering Society Asks Court Review

NSPE requests U. S. Supreme Court to hear appeal from decision subjecting engineering firm to wage-hour law

The National Society of Professional Engineers has filed a "friend of the court" brief in the United States Supreme Court, in support of a petition that asks the high court to hear an appeal from a decision holding a consulting engineer subject to the Fair Labor Standards (wage-hour) Act.

Involved in the appeal is Kenneth R. Brown, consulting engineer, doing business as Brown Engineering Company in Des Moines, Iowa. The original action was brought by the U.S. Secretary of Labor to enjoin Brown from employing members of his staff on local projects related to interstate commerce without paying time-and-a-half for overtime in excess of 40 hours. Reversing the district court which dismissed the action, the Court of Appeals for the Eighth Circuit ruled that Brown was subject to the law.

In its brief to the Supreme Court, NSPE says the basic point, affecting all consulting engineers, is that engineering is a profession and not a business. Hence, it should not be deemed within the federal law directed primarily at regulation of business and commercial enterprises.

"The issue here, in essence," the brief states, "is whether primarily intellectual, non-standardized and unique service, requiring advanced knowledge and training in a professional field, shall be deemed in the same classification as normal business and commercial operations."

• How it started—When the case arose, Brown had approximately 43 employes. Construction projects with which he had been associated and around which the action centered were these: Paving sections of 37 existing streets, all carrying interstate commerce, in four Iowa towns; enlarging a power plant of an interurban railroad that used some of the power to operate a railway moving freight in interstate commerce; installation of additional equipment in the municipal power plant of Pella, Iowa, which supplies power to companies that ship substantial portions of their products out of state; construction of a headquarters building for three rural electrification cooperatives that furnished energy to railroads and factories engaged in interstate commerce, and to telephone companies and radio stations.

Brown's services included preparation of plans and specifications and, through his resident engineer, inspection of work and materials. None of the projects was in the nature of new construction. All were located within the state. The question of professional exemption under section 13 (a) (1) of the act was not discussed by the circuit court, nor did it rule on whether Brown was "in the production of goods for commerce."

• Court's reasoning—The court's attention was directed solely to the question of whether Brown was an employer engaged in interstate commerce. And it was on this point that the district and circuit courts diverged.

The lower court didn't see how Brown's activities on these specific Iowa projects could pull him into interstate commerce. His work on those jobs, it said, was "too far removed from his main activities to have more than a remotely incidental effect." But the circuit court said the Brown "employees' preparation of plans and specifications for the repair and improvement of existing instrumentalities of commerce, together with the activities of the 'resident engineer' at the actual job site, were sufficient to bring them within the coverage" of the act.

In reaching this conclusion, the court professed to be following a U. S. Supreme Court edict that "practical considerations" and not "technical conceptions" should be the guiding factor; that the crucial question is whether the work is "so directly and vitally related to the functioning of an instrumentality or facility of interstate commerce as to be, in practical effect, a part of it, rather than an isolated, local activity."

The court was not concerned about the nature of Brown's business. "Questions of coverage under the Fair Labor Standards Act are determined," it said, "on the basis of the employee's activity and not by the nature of the employer's business."

Is Overtime Over?

Representatives of Vancouver unions, which have spearheaded the drive for abolition of overtime, are expected to line up solidly to support the issue before the Canadian Congress of Labor convention in Toronto next week.

"There's no doubt British Columbia unions will support the principle wholeheartedly," says B. C. Federation of Labor secretary George Home. "Doctors have proved there is a point of working beyond which the adverse effect on health rises steeply."

The resolution urging abolition of overtime will be presented to the convention by the Winnipeg Labor Council "because it does not actually create benefits to the employes, but is a penalty in the form of taxation, loss of social contacts and undue wear and tear on health."

Home said, however, that CCL could only recommend that individual affiliated unions seek abolition of overtime in bargaining with employers.

Prevailing Wages

Contractors and unions disagree on Florida law

The role of union wage scales in prevailing wage determinations has become a controversial issue in the application of the new prevailing wage provisions enacted this year by the Florida legislature.

At a hearing in Tallahassee, where unions, contractors and state officials aired opposing views, the Florida Federation of Labor, the AFL and the CIO argued that the legislature intended to set the union scale as the prevailing wage rates in a metropolitan district and surrounding areas.

Contractors said determinations should be restricted to individual cities or counties with no general lumping for a given area. And James T. Vocelle, chairman of the State Industrial Commission, interpreted the law this way: "The law compels us to find the wage scale paid to the majority in a particular skill as the prevailing wage in each civil division of the state. If the legislature had intended us to use the union scale, it would have put it into the law."

Sparking interest in the controversy is the presence of a number of open-shop contractors within the state.

Under the law, the State Industrial Commission has the job of determining wages for public contracts in excess of $5,000, excluding those for roads and highways but including contracts for bridges costing over $50,000 or built in counties with a population exceeding 100,000.

Prevailing wages are not defined in the statute, which states that ". . . the rate of wages . . . shall be not less than the prevailing rate of wages for similar classifications of work in the city, town, village or other civil division of the state in which the public work is located."

State Senator Charles Johns, who sponsored the law, said the union scale was intended to be the determining factor and that metropolitan rates should govern surrounding counties.

Canadian Painters' Strike Outdoes Arbitration Award

A twelve-day painters' strike that stalled millions of dollars worth of construction in Calgary, Alta., has ended with a new agreement granting a wage increase of 10 cents an hour.

The painters walked out when the Decorating Contractors Association refused to accept a government arbitration board recommendation of a 10-cent increase, retroactive to Aug. 1, plus another 5 cents next year. Although union members had originally asked for 30 cents, they were willing to accept the arbitration award, which is not binding under the law.

Under the new contract, which runs to Dec. 31, 1956, new employes must join the union within 30 days, and job applicants holding Alberta government tradesmen certificates are given employment priority.

Effective immediately, the new scale for brush painters is $1.80. For spray painters, it's $2.00.

Labor Briefs . . .

- **Merger**—Following the U. S. pattern of the AFL and CIO, the Canadian Trades and Labor Congress and the Canadian Congress of Labor plan to merge next spring into a single organization encompassing a million members. The joint convention for adoption of the plan is to meet April 23.

- **Wage boost**—Ending a three-week strike, AFL plasterers in California's San Mateo County gave up their demand for 4% vacation pay and settled for a 16.75-cent increase in basic rates. Retroactive to July 28, the new scale is $3.54¼ an hour.

- **Strike**—In Louisville, Ky., members of Sheet Metal Workers' Local 110, who quit work Sept. 6 to hold a "continuous meeting," have officially gone on strike in an effort to win a 25-cent wage boost. The local's jurisdiction covers Kentucky and part of Indiana.

OFFICIAL PROPOSALS

Bids: October 18, 1955

Texas Turnpike Authority

DALLAS-FORT WORTH TURNPIKE PROJECT

NOTICE TO CONTRACTORS

Sealed proposals for constructing 3.182 miles Grading and Drainage from Meyers Road in Dallas County to Chalk Hill Road in Dallas County covered by Contract No. D-FW 25, in Dallas County, will be received at the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, until 2:30 P. M., October 18, 1955, and then publicly opened and read.

This is a "Turnpike Project" as defined in House Bill No. 4, Chapter 410, Page 967, Acts of the 53rd Legislature, 1953, Regular Session (Codified as Article 6674v, VRCS). No provisions herein are intended to be in conflict with the provisions of said Act.

Section 5(m) of said Act states that "All contracts of the Authority for the construction, repair, or maintenance of any turnpike project shall, insofar as applicable, be made and awarded under the same conditions, terms, requirements and provisions as are now provided for with respect to contracts of the State Highway Department in Sections 8 and 9 of Chapter 186, pages 457, 458, Acts, Thirty-ninth Legislature, 1925, as amended by Chapter 103, page 286, Acts, Forty-third Legislature, First Called Session, 1933, and Sections 10 and 13 of Chapter 186, page 458, Acts, Thirty-ninth Legislature, 1925, codified as Article 6674h, 6674i, 6674j, and 6674m, Vernon's Civil Statutes, and in the making and awarding of such contracts, the Authority shall, insofar as applicable, be under the same duties and responsibilities with respect thereto as are now imposed upon the State Highway Department by the terms and provisions of the Statutes herein enumerated."

In accordance with the provisions of said House Bill, the Texas Turnpike Authority has adopted from the Texas Highway Department and set forth in the proposal the wage rates, for each craft or type of workman or mechanic needed to execute the work on the above named project, now prevailing in the locality in which the work is to be performed, and the Contractor shall pay not less than those wage rates as shown in the proposal for each craft or type of laborer, workman or mechanic employed on this project.

Legal holiday work shall be paid for at the regular governing rates.

Plans and specifications covering the proposed construction may be seen for examination and information at the office of the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, at the Dallas-Fort Worth Turnpike Project Office at 315 S. E. 14th Street, Grand Prairie, Texas, and at the office of the Section Engineer, Turnpike Engineers, at 205 West Main Street, Arlington, Texas. Proposals and plans may be obtained from the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, upon the payment of Twenty-five ($25.00) dollars which sum will not be refunded. The usual rights are reserved.

Bids: October 18, 1955

Texas Turnpike Authority

DALLAS-FORT WORTH TURNPIKE PROJECT

NOTICE TO CONTRACTORS

Sealed proposals for constructing Twin bridges at Ederville Road, Cottonwood Creek and Arlington Park Creek and a single bridge at Randell Mill Road covered by Contract No. D-FW 28, in Tarrant County, will be received at the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, until 2:30 P. M., October 18, 1955, and then publicly opened and read.

This is a "Turnpike Project" as defined in House Bill No. 4, Chapter 410, Page 967, Acts of the 53rd Legislature, 1953, Regular Session (Codified as Article 6674v, VRCS). No provisions herein are intended to be in conflict with the provisions of said Act.

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Bids: October 17, 1955

City of Fort Pierce, Florida

SITE OF SEWAGE TREATMENT PLANT

SEALED PROPOSALS will be received by the City Manager, City of Fort Pierce, Florida, until 5:00 P.M. (Eastern Standard Time) on October 17, 1955, and opened by the City Commission at a meeting starting at 7:30 P.M. on this date in the City Hall, Fort Pierce, Florida, for the construction of a site for a sewage treatment plant, said construction involving hydraulic fill, bulkheading, paving, a sewage force main under water, and an outfall line.

All material and equipment furnished and all work performed shall be in accordance with the plans, specifications and contract documents pertaining thereto, which may be examined at the office of the City Manager, Fort Pierce, Florida, and at the office of Reynolds, Smith and Hills, Architects and Engineers, 227 Park Street (P.O. Box 4817) Jacksonville, Florida. Plans and specifications may be purchased from Reynolds, Smith and Hills, Architects and Engineers, for the sum of $5.00 per set, which will not be refunded. Individual copies of the specifications and partial sets of drawings may be procured for $2.00 per copy and $0.50 per sheet respectively, not refundable.

A Bid Bond properly executed by the Bidder and by a qualified Surety, or a certified or cashier's check on any National or State Bank, in a sum not less than five (5%) percent of the amount bid, made payable to the City of Fort Pierce, Florida, must accompany each bid as a guarantee that the Bidder will not withdraw from the competition after opening the bids, and in the event the contract is awarded to the Bidder, he will, within ten (10) days thereafter, enter into contract and furnish the required bond, failing which he shall forfeit deposit as liquidated damages. The Bid Bond and Performance Bond are required to be secured from an agency of the surety or insurance company, which agency shall have an established place of business in the State of Florida and be duly licensed to conduct business therein.

Each bid shall be addressed to the City Manager, Fort Pierce, Florida, marked "Site for Sewage Treatment Plant, City of Fort Pierce, Florida", and delivered to the office of the City Manager, City Hall, Fort Pierce, Florida, either by a representative of the bidder who shall obtain a receipt therefor or by registered mail with return receipt requested.

The City reserves the right to waive informalities in any bid; to reject any or all bids in whole or in part, with or without cause, and/or to accept the bids that in its judgment will be for the best interests of the City of Fort Pierce, Florida.

CITY MANAGER
CITY OF FORT PIERCE, FLORIDA

OFFICIAL PROPOSALS

RATE: **The rate for Official Proposal advertising is $1.80 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.**

CLOSING DATE: **Friday 10:30 A.M. for issue dated the following Thursday.**

SEND COPY TO: **Official Proposal Division,**
Engineering News-Record
330 West 42nd Street
New York 36, N. Y.

Bids: October 17, 1955

Gideon Putnam Hotel Geyser Park, Saratoga Springs, N. Y.

NOTICE TO BIDDERS
EMPLOYEES DORMITORY

Separate sealed proposals covering Construction, Heating, Sanitary and Electric Works for Employees' Dormitory Gideon Putnam Hotel, Geyser Park, Saratoga Springs, New York, in accordance with Specifications 10-C; 10-HV; 10-S and 10-E and accompanying drawings will be received by the Saratoga Springs Authority at its offices in the Administration Building, Geyser Park, Saratoga Springs, N. Y., until 2:30 P.M. Eastern Daylight Saving Time (1:30 P.M. Eastern Standard Time) on Monday October 17, 1955, when they will be publicly opened and read.

Each proposal must be made upon the form and submitted in the envelope provided therefor and shall be accompanied by a certified check, made payable to the Saratoga Springs Authority, of 5% of the amount of the bid as a guaranty that the bidder will enter into the contract if it be awarded to him. The specification number must be written on the front of the envelope. The blank spaces in the proposal must be filled in, and no change shall be made in the phraseology of the proposal. Proposals that carry any omissions, erasures, alteration or additions may be rejected as informal. The Saratoga Springs Authority reserves the right to reject any or all bids. Successful bidders will be required to give a bond conditioned for the faithful performance of the contract in the sum of 100% of the amount of the contract and a separate bond for the payment of laborers and materialmen in the sum of 100% of the amount of the contract.

Drawings and specifications may be examined free of charge at the office of the Saratoga Springs Authority, Administration Building, Geyser Park, Saratoga Springs, New York, and at the office of the Architect, August Lux and Associates, 143 Washington Avenue, Albany, New York.

Drawings and specifications may be obtained at the above named office of the Saratoga Springs Authority, by making a deposit for each set as follows:—Construction $20.00, Heating $10.00, Sanitary $10.00, Electric $5.00 or by mailing such deposit to the Saratoga Springs Authority at the above address. Checks should be made payable to the Saratoga Springs Authority. Proposal blanks and envelopes will be furnished without charge.

Bids: October 25, 1955

Contracts 451 and 452

WEST DELAWARE TUNNEL

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Daylight Saving Time, (10:00 A.M., Eastern Standard Time), on Tuesday October 25, 1955, for the following two contracts for the construction of the westerly portion of the West Delaware Tunnel of the Delaware system, comprising about 20 miles of concrete lined pressure tunnel, circular in section and 11 feet 4 inches in finished diameter, and Shafts 1 to 3 inclusive, 14 feet in diameter, which will be circular in section and lined with concrete, all as set forth in the specifications:

CONTRACT 451, for the construction of about 43,000 liner feet of tunnel, including an intake channel and Shaft 1, approximately 520 feet deep, located in the Towns of Tompkins and Hancock, Delaware County, New York.

CONTRACT 452, for the construction of about 60,000 linear feet of tunnel, including Shaft 2, approximately 310 feet deep, and Shaft 3, approximately 460 feet deep, located in the Towns of Hancock and Colchester, Delaware County, New York.

A bidder on both of these contracts may, if he so desires, specify in the bid form of either or both contracts, that he will agree to make a percentage reduction from the total cost of the contract, if both contracts are awarded to him.

Pamphlets of the two contracts containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in the Chief Clerk's office, Room 1317 at the above address, upon application in person or by mail, by depositing the sum of $5.00 for each pamphlet. Within 30 days following the award of contract or rejection of bids the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: November 3, 1955

City of Tampa, Florida

Sewer Improvements

Sealed proposals for construction of Vitrified Clay Pipe Sewers complete with all appurtenances, will be received at the regular meeting place of the Board of Representatives, City Hall, Tampa, Florida, until 2 P.M., E.S.T., November 3, 1955, there to be publicly opened and read aloud.

The work is divided into six Divisions. The Bidder may submit a proposal for any Division, all Divisions, or any combination of Divisions.

The approximate quantities of the principal work involved are as follows:

Div. XE17—62,700 Lin. ft. of 8-inch V.C. pipe sewers

Div. XE18—53,440 Lin. ft. of 8, 10 and 12-inch V.C. pipe sewers

Div. XE19—41,560 Lin. ft. of 8, 10 and 12-inch V.C. pipe sewers

Div. XE20—26,800 Lin. ft. of 8 and 12-inch V.C. pipe sewers

Div. XE21—66,780 Lin. ft. of 8 to 21-inch V.C. pipe sewers

Div. XE22—23,400 Lin. ft. of 8-inch V.C. pipe sewers.

Plans and Contract Documents may be examined at and obtained from the offices of the Bureau of Sanitary Sewers, 6th Floor, City Hall, Tampa, Florida, and the offices of Greeley and Hansen, Engineers, 220 South State Street, Chicago 4, Illinois. A deposit of $25.00 is required for each set of contract documents covering the six divisions.

City of Tampa, Florida
By Curtis Hixon, Mayor
Dated September 28, 1955

Prequalification Date: October 12, 1955

Board of Education Bureau of Construction

Notice Re Prequalification Forms For Contractors

NOTICE IS HEREBY GIVEN THAT THE Director of the Bureau of Construction, Fourth Floor, 42-15 Crescent Street, Long Island City 1, New York, will receive applications for prequalification of bidders, from contractors who may wish to submit bids for the proposed hereinafter specified contracts, as follows:

For (1) general construction, (2) plumbing and drainage, (3) heating and ventilating. (4) electrical work and lighting fixtures for the following schools:

BOROUGH OF BROOKLYN
Junior H. S. 66, Osborn & Watkins Sts. Modernization.
BOROUGH OF BRONX
Junior H. S. 143, West 231st St. & Sedgwick Ave., New Building.
BOROUGH OF MANHATTAN
Junior H. S. 44, Columbus Ave. and West 76th St., New Building.
BOROUGH OF QUEENS
P. S. 47, Shad Creek & Power Road, 196th & 197th Sts., New Building.

Prequalification application forms will have to be secured and must be submitted to the Director, Bureau of Construction office, 4th Floor, Room 407, 42-15 Crescent Street, Long Island City 1, New York.

Bids will be received from prequalified bidders only.

The time for submitting prequalification application forms for the above contracts will expire on Wednesday, October 12th, 1955.

WILLIAM H. CORREALE
Director
Dated: September 26th, 1955.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-4522) will be received at Denver, Colorado, until November 17, 1955, for furnishing two or three sets each of two motor-driven, vertical-shaft, turbine-type pumping units, each set with a capacity of 300 gpm under a total head of 1,740 feet; one diesel-electric generating set for driving above pumps; and motor control equipment for Anjar Spring Pumping Plant, Lebanon Project. Delivery is desired within 345 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation.. Sealed bids (Specifications No. DC-4528) will be received at Riverton, Wyoming, until November 16, 1955, for furnishing labor and materials for earthwork and structures, Cottonwood Drain Terminal Wasteway, Wyoming Canal Lateral System, Riverton Project, Wyoming. Location near Riverton, Wyoming. Principal items are 6,350 cu. yds. excavation; 28 cu. yds. concrete; 1,315 lin. ft. furnishing and laying 30-inch diameter HC50 concrete pressure pipe; 580 lin. ft. furnishing and laying 36-inch diameter HC50 concrete pressure pipe; and other work. Completion time 180 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 71, Riverton, Wyoming; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: October 26, 1955

Power Authority of the State of New York

ST. LAWRENCE POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY OF
FIXED HOIST ASSEMBLIES
FOR
LONG SAULT DAM
SPECIFICATIONS NO. PA-5-15076
ST. LAWRENCE CONTRACT NO. P28

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW

YORK will receive sealed proposals for the manufacture and furnishing of eighteen (18) Fixed Hoist Assemblies for Long Sault Dam and delivery thereof f.o.b. the Authority's classification yard, Massena, New York in the following ways:

(1) If brought in person, on the day of receiving bids until 10:30 A. M. Eastern Daylight Saving Time on the 26th day of October, 1955, 270 Broadway, Hearing Room C on the sixth floor, New York 7, New York.

(2) If mailed in, until 10:15 A. M. Eastern Daylight Saving Time, on the 26th day of October, 1955, at the Authority's office, 270 Broadway, Room 1300, New York 7, New York.

The proposal will be publicly opened and read aloud at the time and at the address given in (1) above.

Bids will be entertained for eighteen 175 ton fixed hoists and accessories together with the structural steel supporting structures and towers upon which the hoists are mounted.

Bids will not be restricted to American manufacturers.

Plans, specifications and proposal forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours, and may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, upon application and prepayment of a fee of Twenty ($20.00) dollars per initial set of contract documents and Ten ($10.00) dollars per set for additional sets, no part of which will be refunded. Two sets must be returned with each bid.

Bids must be made in duplicate upon the proposal forms included in and bound with the Contract Documents. A bid deposit will be required with each bid in an amount not less than 10 percent of the maximum price bid for any bid schedule.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

September 23, 1955

Bids: October 18, 1955

State of New Jersey State Highway Department Trenton

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Commissioner for:

ROUTE S40 (1927) ROUTE 72 (1953), SECTION 5-C, MANAHAWKIN BAY BRIDGE, CONTRACT #1—SUBSTRUCTURE

Route S40(1927) Route 72(1953), Section 5-C, Manahawkin Bay Bridge, Contract No. 1—Substructure, Stafford Township, Ocean County. Federal Project No. F-130(4). The principal items of construction are:

Estimated:	10,832	cu. yds. Concrete in Structures
	4,334	cu. yds. Seal Concrete
	894,820	lbs. Reinforcement Steel in Structures
	98,120	lin. ft. Untreated Timber Piles
	7,130	lin. ft. Cast-in-place Concrete Piles
	61,359	sq. ft. Steel Sheet Piling left in place
	116	cu. yds. Granite Masonry

Bids for the above will be received at the office of the State Highway Department, in the CAFETERIA, State Highway Office Building, 1035 Parkway Avenue, Trenton, N. J., on Tuesday, October 18, 1955, at NINE o'clock (9:00 A.M.—EASTERN STANDARD TIME), TEN o'clock (10:00 A.M.—DAYLIGHT SAVING TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plan and equipment with their bid.

NOTE: The proposed project is a "Federal Aid Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements and by P. L. 350, 83rd Congress, and is to be performed in accordance with the "Required Provisions—Federal Aid Contracts" of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications. The attention of the bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all common labor employed on this contract shall be $0.75 per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be $1.00 per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.50 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, N. J., and may be inspected by prospective bidders during office hours. Plans and supplementary specifications will be furnished upon payment of a fee of FIFTEEN DOLLARS ($15.00) for each set upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Ave., Trenton, N. J., with a check drawn to the order of the State Highway Department. A charge of $5.00 will be made for supplementary specifications unaccompanied by construction plans. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by the following documents: (1) a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500. nor more than $20,000.; (2) a proposal bond for a sum of not less than fifty percent (50%) of the total price bid for the project; (3) a financial statement (Part 1 of the Prequalification Questionnaire); (4) a plan and equipment statement (Part 3 of the Prequalification Questionnaire); and (5) a Non-collusion Affidavit executed in duplicate; and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed:
STATE HIGHWAY DEPARTMENT
A. Lee Grover, Chief Clerk

Bids: October 19, 1955

Texas Turnpike Authority

DALLAS-FORT WORTH TURNPIKE PROJECT
NOTICE TO CONTRACTORS

Sealed proposals for constructing one twin bridge located at Village Creek covered by Contract No. D-FW 29, in Tarrant County, will be received at the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, until 2:30 P. M., October 19, 1955, and then publicly opened and read.

This is a "Turnpike Project" as defined in House Bill No. 4, Chapter 410, Page 967, Acts of the 53rd Legislature, 1953, Regular Session (Codified as Article 6674v, VRCS). No provisions herein are intended to be in conflict with the provisions of said Act.

Section 5(m) of said Act states that "All contracts of the Authority for the construction, repair, or maintenance of any turnpike project shall, insofar as applicable, be made and awarded under the same conditions, terms, requirements and provisions as are now provided for with respect to contracts of the State Highway Department in Sections 8 and 9 of Chapter 186, pages 457, 458, Acts, Thirty-ninth Legislature, 1925, as amended by Chapter 103, page 286, Acts, Forty-third Legislature, First Called Session, 1933, and Sections 10 and 13 of Chapter 186, page 458, Acts, Thirty-ninth Legislature, 1925, codified as Article 6674n, 6674i, 6674j, and 6674m, Vernon's Civil Statutes, and in the making and awarding of such contracts, the Authority shall, insofar as applicable, be under the same duties and responsibilities with respect thereto as are now imposed upon the State Highway Department by the terms and provisions of the Statutes herein enumerated".

In accordance with the provisions of said House Bill, the Texas Turnpike Authority has adopted from the Texas Highway Department and set forth in the proposal the wage rates, for each craft or type of workman or mechanic needed to execute the work on the above named project, now prevailing in the locality in which the work is to be performed, and the Contractor shall pay not less than those wage rates as shown in the proposal for each craft or type of laborer, workman or mechanic employed on this project.

Legal holiday work shall be paid for at the regular governing rates.

Plans and specifications covering the proposed construction may be seen for examination and information at the office of the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, at the Dallas-Fort Worth Turnpike Project Office at 315 S. E. 14th Street, Grand Prairie, Texas, and at the office of the Section Engineer, Turnpike Engineers, at 205 West Main Street, Arlington, Texas. Proposals and plans may be obtained from the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, upon the payment of Twenty-five ($25.00) dollars which sum will not be refunded. The usual rights are reserved.

COMMONWEALTH OF VIRGINIA, DEPARTMENT OF HIGHWAYS, RICHMOND, VIRGINIA, September 28, 1955. Sealed Bids will be received at the Department of Highways, Room 400, Central Highway Office Building, 1221 East Broad Street, Richmond, Virginia, until 10:00 A.M., Wednesday, November 16, 1955, on Hampton Roads Project, Contract No. C-3 for the construction of: Cut and Cover Tunnel Sections, Ventilation Buildings and Tunnel Open Approaches. Crash Truck Buildings including foundations; Mechanical and Electrical Work, Complete. Miscellaneous Work, including railings on Tunnel and Bridge Approaches, hand rail in Tunnel, Police Booths, and sidewalks, curbs and walls and rough grading on Portal Islands. Prospective bidders will meet the Virginia Department of Highways' Representative at the Chamberlin Hotel, Old Point Comfort, Virginia, 10:00 A.M., Friday, October 14, 1955, to be shown over the location of proposed work. Plans and Specifications are on file at the Richmond Office; Director of Ferries, Norfolk, Virginia, and Parsons, Brinckerhoff, Hall and Macdonald, Engineers, 51 Broadway, New York 6, N. Y. Cost of Plans and Specifications: $82.50—Additional Specifications: $7.50. NO REFUND ALLOWED. Proposal Guaranty: A certified or cashier's check, made payable to the Commonwealth of Virginia, in the sum of not less than one per cent (1%) of the Bid Lump Sum Price. In addition to the above, the bidder shall furnish a Proposal Bond made payable to the Commonwealth of Virginia, in an amount of not less than twenty per cent (20%) of the Bid Lump Sum Price. Such Bond shall be executed on the form furnished by the Department of Highways and shall meet all the requirements of the State of Virginia. This Proposal Bond shall be signed by a local resident agent. Contractors must have on file approved prequalification papers prior to receiving proposals. The Commission reserves the right to reject any or all proposals submitted in response to this advertisement, and to waive technicalities as it may deem best for the interest of the State. PLANS WILL NOT BE MAILED PRIOR TO RECEIPT OF PAYMENT OF COST SHOWN IN THIS ADVERTISEMENT.

Bids: November 7, 1955

City of Fort Myers Fort Myers, Florida

NOTICE TO CONTRACTORS SEWAGE COLLECTION AND TREATMENT PROGRAM

Sealed proposals will be received by the City of Fort Myers, Florida, until 8 PM, November 7th, 1955, at which time they will be publicly opened and read.

The work consists of constructing a 3.5 MGD sewage treatment plant, outfall sewer and four sewage pumping stations; approximately 110,000 linear feet of interceptor, trunk, main and lateral sewers; modification or demolition of 8 existing sewage pumping stations; two package lift stations and appurtenant work, located in the City of Fort Myers.

All work performed shall be in accordance with plans, specifications and contract documents which may be obtained from GEE & JENSON, INC., CONSULTING ENGINEERS, 309 Comeau Building, West Palm Beach, Florida, for the sum of $25 which amount will not be refunded.

Publish October 6, 1955

OFFICIAL PROPOSALS

Bids: November 9 and 10, 1955

City of Lancaster Authority
Lancaster, Pennsylvania

Sealed proposals will be received by the City of Lancaster Authority in the Council Chamber of the Municipal Building, Lancaster, Pennsylvania until the date and time mentioned under each contract below, at which place and hour they will be publicly opened, for furnishing all necessary labor, materials, and equipment and performing all work necessary for the construction required to complete each contract.

The right is reserved to reject any or all proposals, and to readvertise and award the contract in the regular manner, or to waive any informality in the proposals received and to accept any proposal deemed to be most favorable to the interest of the City of Lancaster Authority.

Bids will be taken under advisement and the award of the contract, if awarded, will be made within forty-five (45) days after the date of opening the bids.

Each proposal must be accompanied by a money deposit in the form of a certified check on a solvent bank, payable to the City of Lancaster Authority, in an amount not less than ten (10) per cent of the bid total, in accordance with the provisions contained in the Specifications. A satisfactory bidders bond will be accepted in lieu of check. The deposits of bidders other than the one to whom the contract is awarded will be returned immediately after the award is made. The successful bidder will be required to execute a contract and furnish bonds within ten (10) days from the date of notice of award delivered or mailed to him. Upon execution of the contract and approval of the bonds the deposit of the successful bidder will be returned. The amount of security required for the faithful performance of the work will be one hundred (100) per cent of the estimated cost of the work according to the contract price.

Copies of the Contract Documents, including Drawings and Specifications, may be seen at the offices of Gannett Fleming Corddry and Carpenter, Inc., 600 North Second Street, Harrisburg, Pennsylvania, or 213 West Orange Street, Lancaster, Pennsylvania, on or after October 3rd, 1955; or they may be obtained upon deposit of the various sums stated under each contract.

Contract No. 1—15 Million Gallon Reinforced Concrete Reservoir. Plans and Specifications thirty ($30.00) dollars with full refund to bidders or ten ($10.00) dollars refund to others for all sets returned in good condition. Bids to be opened 10:00 A.M., November 9, 1955.

Contract No. 2—42" Pipe Line and Appurtenances. Major quantities 24,100 feet 42" steel or concrete pipe, 960 feet 36" steel pipe, 860 feet 30" steel pipe. Plans and Specifications fifty ($50.00) dollars with full refund to bidders, or twenty ($20.00) dollars to others for all sets returned in good condition. Bids to be opened 2:00 P.M., November 9, 1955.

Contract No. 3—42" Pipe Line and Appurtenances. Major quantities 31,400 feet steel or concrete pipe. Plans and Specifications fifty $(50.00) dollars, full refund to bidders, or twenty ($20.00) dollars to others for all sets returned in good condition. Bids to be opened 2:00 P.M., November 9, 1955.

Contract No. 4—General Contract—8 M.G.D. Filter Plant. Includes filter building, clarifiers, two pumping stations, mechanical equipment, river intake. Plans and Specifications sixty ($60.00) dollars, full refund to all bidders, thirty ($30.00) dollars refund to others for all sets returned in good condition. Bids to be opened 10:00 A.M., November 10, 1955.

Contract No. 5—Electrical Work on 8 M.G.D. Filtration Plant and Two Pumping Stations. Plans and Specifications thirty ($30.00) dollars, full refund to bidders, fifteen ($15.00) dollar refund to others for all sets returned in good condition. Bids to be opened 10:00 A.M., November 10, 1955.

Contract No. 6—Heating on 8 M.G.D. Filtration Plant Building and Two Pumping Stations. Plans and Specifications twenty-five ($25.00) dollars, full refund to bidders, ten ($10.00) dollars refund to others for all sets returned in good condition. Bids to be opened 2:00 P.M., November 10, 1955.

Contract No. 7—Sanitary Plumbing on 8 M.G.D. Filtration Plant and Two Pumping Stations. Plans and Specifications twenty-five ($25.00) dollars, full refund to bidders, ten ($10.00) dollars refund to others for all sets returned in good condition. Bids to be opened 2:00 P.M., November 10, 1955.

Contract No. 8—300,000-Gallon Elevated Tank. Furnish and erect all structural work. Foundation not included. Plans and Specifications ten ($10.00) dollars, no refund. Bids to be opened 10:00 A.M., November 9, 1955.

OFFICIAL PROPOSALS

Contract No. 9—Bridgeport Area Distribution System. Major quantities, all pipe class 150 M.J., 6,800 feet 12", 5,100 feet 8", 21,000 feet 6", 1,300 feet 4", 38 hydrants, 330 service connections. Plans and Specifications ten ($10.00) dollars, no refund. Bids opened 10:00 A.M., November 9, 1955.

Contract No. 10—New Holland Pike Distribution System. Major quantities, all pipe class 150 M.J., 2,680 feet 16", 5,500 feet 10", 17,300 feet 6", 530 feet 4", 24 hydrants, 180 service connections. Plans and Specifications ten ($10.00) dollars, no refund. Bids opened 10:00 A.M., November 10, 1955.

Contract No. 11—Quarryville Pike Distribution System.

Contract No. 12—Willow Street Distribution System.

Contract No. 13—Neffsville Distribution System.

These three (3) contracts are similar to 9 and 10. Plans ready October 17th. Plans and Specifications ten ($10.00) dollars for each contract, no refund. Bids opened on Contract No. 11 at 2:00 P.M., November 9, 1955. Bids opened on Contracts No. 12 and No. 13 at 2:00 P.M., November 10, 1955.

City of Lancaster Authority
W. E. Alexander, Chairman

Bids: October 19, 1955

Texas Turnpike Authority

DALLAS-FORT WORTH TURNPIKE PROJECT

NOTICE TO CONTRACTORS

Sealed proposals for constructing eight bridges located at Sandy Lane Road, Morrison Drive, Cooke's Lane, Henry Road, Bedford-Arlington Road, Beady Road, Duncan Perry Road and Nelson Street covered by Contract No. D-FW 27, in Tarrant and Dallas County, will be received at the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, until 2:30 P. M., October 19, 1955, and then publicly opened and read.

This is a "Turnpike Project" as defined in House Bill No. 4, Chapter 410, Page 967, Acts of the 53rd Legislature, 1953, Regular Session (Codified as Article 6674v, VRCS). No provisions herein are intended to be in conflict with the provisions of said Act.

Section 5(m) of said Act states that "All contracts of the Authority for the construction, repair, or maintenance of any turnpike project shall, insofar as applicable, be made and awarded under the same conditions, terms, requirements and provisions as are now provided for with respect to contracts of the State Highway Department in Sections 8 and 9 of Chapter 186, pages 457, 458, Acts, Thirty-ninth Legislature, 1925, as amended by Chapter 103, page 286, Acts, Forty-third Legislature, First Called Session, 1933, and Sections 10 and 13 of Chapter 186, page 453, Acts, Thirty-ninth Legislature, 1925, codified as Article 6674n, 6674i, 6674j, and 6674m, Vernon's Civil Statutes, and in the making and awarding of such contracts, the Authority shall, insofar as applicable, be under the same duties and responsibilities with respect thereto as are now imposed upon the State Highway Department by the terms and provisions of the Statutes herein enumerated".

In accordance with the provisions of said House Bill, the Texas Turnpike Authority has adopted from the Texas Highway Department and set forth in the proposal the wage rates, for each craft or type of workman or mechanic needed to execute the work on the above named project, now prevailing in the locality in which the work is to be performed, and the Contractor shall pay not less than those wage rates as shown in the proposal for each craft or type of laborer, workman or mechanic employed on this project.

Legal holiday work shall be paid for at the regular governing rates.

Plans and specifications covering the proposed construction may be seen for examination and information at the office of the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, at the Dallas-Fort Worth Turnpike Project Office at 315 S. E. 14th Street, Grand Prairie, Texas, and at the office of the Section Engineer, Turnpike Engineers, at 205 W. Main, Arlington, Texas. Proposals and plans may be obtained from the Texas Turnpike Authority, 214 First Federal Savings Building, Austin 1, Texas, upon the payment of Twenty-five ($25.00) dollars which sum will not be refunded. The usual rights are reserved.

U. S. Government

NAME AND LOCATION OF PROJECT—Project No. 53-103, Additional Section of Intercepting Sewer Charlotte Amalie, St. Thomas, Virgin Islands. DEPARTMENT OR AGENCY—OFFICE OF TERRITORIES, DEPARTMENT OF THE INTERIOR, by (issuing office) Division of Insular Affairs, Office of Territories, Department of the Interior, Room 6412 Interior Building, Washington 25, D. C. Sealed bids in single copy for furnishing all labor, equipment, and materials and performing all work for the project described herein will be received until 3:00 P.M. Atlantic Standard Time, October 20, 1955, in the Office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands and then publicly opened and read aloud. Information regarding bidding material, bid guarantee, and bonds, plans and specifications and other proposed contract documents are open for public inspection at the office of the Director, Virgin Islands Public Works, Division of Insular Affairs, Office of Territories, Department of the Interior, Charlotte Amalie, St. Thomas, Virgin Islands; R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama; Lester M. Marx, Room 2713 Interior Building, Washington 25, D. C.; Housing and Home Finance Agency, Room 313 N. Y. Department Store Building, 1064 Ponce de Leon, Santurce, Puerto Rico; A.G.C. Office, 1113 Congress Building, Miami, Florida; Builders Exchange, 46 Northeast 6th Street, Miami, Florida; F. W. Dodge Corporation, 119 West 40th Street, New York 18, N. Y.; and A.G.C. Office at Palm Beach, Florida. Plans and specifications may be procured from the office of R. L. Kenan & Associates, Consulting Engineers, Bell Building, Montgomery, Alabama, upon deposit of $20.00. Deposit shall be only by certified check payable to the Treasurer of the United States, which will be refunded to bona fide bidders upon the return of plans and specifications in good condition within thirty (30) calendar days from the date of bid opening. A bona fide bidder includes any person who submits a bid for a general contract, but does not include a person who submits a quotation to the general contract bidders. To persons who procure plans and specifications upon payment of $20.00 and who do not submit a bid, $15.00 will be refunded upon the return thereof, in good condition, within thirty (30) calendar days from the date of bid opening. No refund will be made for return after that time. Bonds, etc.—Each bid must be accompanied by a satisfactory bid guaranty in an amount not less than 5 percent of the total bid. The successful bidder will be required to furnish a performance bond and payment bond, each in the amount of 100 percent of the contract price. No bid may be withdrawn until thirty (30) calendar days after the scheduled closing time for the receipt of bids. The Government reserves the right to waive any informality and to reject any or all bids, when such is in the interest of the Government. Description of Work—The construction of an additional section of the intercepting sewer, paralleling the existing 18-inch V.C. intercepting sewer, or meandering in the same general direction, from the vicinity of NY Tvaer Gade to the Lift Station near the French Village which includes the following approximate quantities: 1 Reinforced Concrete Grit Chamber, 11 Concrete Manholes (0 to 14 depth), 260 Lin. Ft. 8" Pipe (Hauling and Installing Only), 500 Lin. Ft. 10" Pipe (Hauling and Installing Only), 1,070 Lin. Ft. 18" Pipe (Hauling and Installing Only), 440 Lin. Ft. 20" Pipe (Hauling and Installing Only). The cast iron sewer pipe will be furnished at St. Thomas, Virgin Islands from Government surplus. The majority of trench for 18" and 20" sewer will be in dredged fill and the pipe invert will be approximately 6′ to 8′ below sea level in trenches 8′ to 12′ deep.

Contractors Watch
This Section—

for new projects. Publish your announcements through the proposal sections of *Engineering News-Record* and get their bids.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

NATIONAL COVERAGE

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities....
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

—RATES—

DISPLAYED

The advertising rate is $24.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

UNDISPLAYED

$1.80 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to ENGINEERING NEWS-RECORD, 330 W. 42nd St., N. Y. 36, N. Y. for October 20th issue closing October 10th.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

Construction Foreman for firm engaged in extensive sewer, water main and treatment plant facilities. Permanent position in N. Y. State area. Only qualified applicants with broad experience. P-6595, Engineering News-Record.

Building Construction Superintendent — Wanted at once for large school project in Cedar Rapids. Must be well qualified and experienced. Project duration approximately two (2) years. Position permanent for right man. Write stating qualifications, habits, experience, previous employment, references, availability, and salary expected. Address reply to R. F. Ball Construction Company, Inc., Post Office Box 2300, San Antonio, Texas.

Experienced structural designers and detailers for work on reinforced concrete and steel highway structures with consulting engineers. Please give age, qualifications and salary requirements in reply. P-7462, Engineering News-Record.

Structural Engineer for building design Ketchum and Konkel, Consulting Engineers, 1090 Fox Street, Denver 4, Colorado.

Estimator for established firm engaged in the engineering and construction of complete industrial plants. Should have at least five years experience in pricing labor and material on large scale industrial projects. Location, Pittsburgh. Please furnish resume of experience and training. P-7647, Engineering News-Record.

Civil Engineer—For plan engineer position. Duties include sewer and water main design and field work. Salary range $385 to $460 per month. Apply City Engineer, City Hall, South Milwaukee, Wisconsin.

Estimator wanted for permanent position with pharmaceutical firm. Should be familiar with building construction, chemical equipment installation and industrial maintenance. Will estimate labor performed by company craftsmen in the several trades as well as costs of materials, equipment, etc. Should have sufficient experience and be capable of compiling a unit cost manual for use by the Engineering Department. Engineering degree desirable but not absolutely necessary. P-7882, Engineering News-Record.

Civil Engineer, research and development—experienced in asphalt pavement construction and with ability to prepare construction specifications and technical manuals. Pleasant living conditions with special employment benefits. Location East Coast. State salary expected. P-7887, Engineering News-Record.

Assistant Chief Engineer, project engineer, design engineer, project supervisor, positions with industrial organization developing new and unusual metal forming and treating processes. Necessary to have engineering degree and experience background in machine design. Work is highly varied and directed toward fields having strong future. Post graduate training desirable but not essential. Salary to match experience and training. Ideal West Coast community and environmental factors. P-7888, Engineering News-Record.

Construction Supts—with gunite, grodting and all around experience—location East—steady employment and high pay for capable men. Please send resume of experience. Our employes know of this ad. P-7807, Engineering News-Record.

(Continued on following page)

ENGINEERS — DESIGNERS

Chemical - Mechanical - Electrical - Structural - Piping

San Francisco assignment

Recent design experience on petroleum refineries, chemical plants, or related projects. Compensation commensurate with ability. Liberal moving allowances.

Please write furnishing complete chronological experience record and salary history, also full details regarding education, salary desired, businesss and character references.

BECHTEL CORPORATION

220 Bush Street **San Francisco 4, Calif.**

MECHANICAL ENGINEER

Graduate Mechanical Engineer experienced in the operation of Fourdrinier paper machines, refining and related equipment for large expanding and progressive mill in Middle Atlantic States. Under 35 years of age. Good salary and excellent opportunity for advancement. Give detailed resume of experience. Send resume to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

CHIEF CHEMIST

degree and experience in chemical testing of construction materials, cement, asphalt, metals by ASTM & AASHO. Knowledge in use of Spectrophometer desirable, not essential. Location, Gulf Coast. Send complete resume and Sale requirements to Box

P-7808, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

BRIDGE ENGINEERS

Civil Graduates of accredited U. S. colleges. Must have not less than the following experience:

Detailers—2 years structural steel or reinforced concrete detailing.

Designers—4 years responsible work on structural steel and concrete including work on long span bridges.

Mail complete resume together with salary required to:

Howard, Needles, Tammen & Bergendoff
55 Liberty Street **New York 5, N. Y.**

WANTED

GRADE FOREMEN

for work in New Jersey. Top salary.

***Call* S. J. GROVES & SONS CO.,**
MR. OAK,
Moorestown, N. J. **9-2600**

SANITARY ENGINEER

Opportunity available for Sanitary Engineer in an expanding pulp and paper mill located in the Middle Atlantic States. Age 25-35 years. Require man experienced in paper mill wastes, paper mill stream pollution and paper mill water purification. No other experience will be given consideration. Good salary and advancement. All replies confidential. Send resume of educational background and industrial experience to Director of Personnel

West Virginia Pulp & Paper Company
Luke, Maryland

SALARIED POSITIONS $5,000 — $35,000

We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars.

R. W. BIXBY, Inc.
659 Brisbane Bldg. **Buffalo 3, N. Y.**

OVERSEAS EMPLOYMENT
Guam Project

BUILDING SUPERINTENDENTS

Must have at least 8 years' supervisory experience on large industrial type projects. Candidates for above position must be familiar with site preparation, installation of temporary buildings, utilities, and the erection and finishing of reinforced concrete type buildings.

Write, giving detailed account of experience, education, etc.

BROWN-PACIFIC-MAXON
"Guam" Contract NBy-13931
P. O. Box 3316, Rincon Annex
San Francisco "19" - Calif.

FOREIGN AIRBASE

Immediate openings for

ARCHITECTURAL
MECHANICAL
HIGHWAY-AIRFIELD
DESIGN ENGINEERS
ESTIMATORS &
DRAFTING SUPERVISORS

Must have degree (or equivalent) plus 6-10 years specialized exp.

MIN. TO $11,000 + OVERTIME

Airmail resume to

P-7757, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

ENGINEEER-LABORATORY DIRECTOR

degree and supervisory experience required. Advanced soil mechanics degree desirable. Must have experience testing soils, concrete, steel, and general construction materials by standard procedures. Location, Gulf Coast. Send complete resume and salary requirements to Box

P-7809, Engineering News-Record
330 W. 42nd St., New York 36, N. Y.

SANITARY ENGINEER

Well established Midwestern consulting firm requires the services of an experienced sanitary engineer. Man between 30 and 45 years of age who is experienced in design of sewage and industrial waste plants. Must be able to take complete charge of major projects from prelimnary engineering studies through the design and construction stages. Minimum starting income $8,500.00 with extra benefits including retirement and profit participation plans. This is a permanent position with excellent opportunities for advancement. Applicant must be able to perform contact work with clients and direct all phases of the project. Give age, education, experience, and earliest date available. Replies will be held in strict confidence.

P-7897, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

WANTED: ASS'T TRAFFIC ENGR.

For traffic engineering department just recently established. Salary range $554 to $670 a month with maximum salary obtainable through annual and longevity increases. Registration as a professional engineer required. Applications accepted until the needs of the service are filled. Write Personnel Department, City Hall, Madison 3, Wis.

POSITIONS VACANT

(Continued from preceding page)

Assistant Engineer, civil engineering background. Training and experience in one or more of the following: design of subdivisions; sewer and water; streets. This is a career position in a consulting engineer's office. Applicant must be available immediately. Salary to $8000. State experience, education and give references. Lester V. Johnson Associates 2309 Wilson Boulevard Arlington 1, Virginia.

Licensed engineer, superintendent experienced in school construction in Norwalk, Conn. area. Must be able to handle entire job. Two references, state salary. Fabrizio & Martin Inc., 21 McLaren Road, Darien, Conn. OLiver 5-4400.

Mechanic Wanted—experienced with contractors equipment, large shovel tractor, etc. Must have tools. Please furnish references. Job location Tennessee. Permanent. P-7867, Engineering News-Record.

Dam Engineers, minimum of four years experience in construction and/or design of dams, preferably with a working knowledge of soil mechanics and concrete control for duties involving review of plans and specifications, report writing, field investigations and inspections, with some travel and public relations. Opportunity for administrative experience and advancement. Hydraulic engineers, experienced in design and preparation of contact plans for flood control projects. Will be engaged in long range flood control program. Opportunities for gaining broad experience and for advancement. Location. Pennsylvania. Give full details of experience, education, age, salary expected and references. Address replies to P-7870, Engineering News-Record, 330 W. 42nd Street, New York 36, N. Y.

Estimator—Landclearing, logging, transportation fields internationally known manufacturer of heavy equipment has immediate opening for estimator with experience in one of these fields. Position involves field observation and analysis of job application of manufacturer's products. Age 35-up. Excellent opportunity for advancement. All replies confidential. Submit complete details to: R. G. LeTourneau, Inc., Sales Department, Longview, Texas.

Engineer to design and write up specifications for fishways, hatcheries, counting weirs, and other engineering projects and to supervise construction of same. For application forms and further details, write to Alaska Department of Fisheries, 229 Alaska Office Building, Juneau, Alaska.

POSITIONS VACANT

Experienced man to have complete supervision of parts department for heavy construction equipment distributor located in Northern New York State. Must have complete knowledge of parts purchasing and invoicing procedures. Reply P-7856, Engineering News-Record.

Structural Steel detailers and checkers— permanent employment offered to qualified men. Please send experience record and salary required to Pittsburgh Des Moines Steel Company, Santa Clara, California.

General Construction estimator and superintendent—advise education, experience, age, salary expected and when available. Location Syracuse, N. Y. P-7855, Engineering News-Record.

Engineer—young sanitary or chemical, to direct program of state stream pollution control program. Salary $7000.00 per year. Submit education and experience resume West Virginia State Water Commission, 1709 Washington Street, East, Charleston 1, West Virginia.

SELLING OPPORTUNITY OFFERED

Salesman, construction equipment, have exclusive New York City territory for one of leading dealers. Extensive experience necessary. RW-7721, Engineering News-Record.

EMPLOYMENT SERVICE

Salaried personnel, $5,000-$30,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, P. O. Box 674, Manchester, Vermont.

POSITIONS WANTED

Civil Engineer, B.S.C.E. '54. Desires to relocate East or West coast with fabricator, contractor or consultant. Age 31, married. PW-7751, Engineering News-Record.

Senior Structural Engineer registered in several states with connections to State Highway and Bridge Departments wishes partnership with established engineering firm. PW-7886, Engineering News-Record.

Executive—Office Manager—18 years with heavy construction contractor, main office. Thoroughly experienced in all phases of office procedure—finance, insurance, payrolls, etc. A1 business and character references. Interested in connecting with progressive organization. New York Metropolitan Area. PW-7640, Engineering News-Record.

Superintendent—Maintenance 27 years experience in firebrick & chemical brick construction desires position in Western states. Oil refinery, chemical plant or steel plant. Apply to PW-7701, Engineering News-Record.

Civil-Structural Engineer, seasoned with excellent diversified domestic and foreign experience, knowing languages, wishes foreign position of responsibility and trust. PW-7889, Engineering News-Record.

Civil engineer desires work in irrigation, hydro-development, or general consulting. Have varied experience in reinforced concrete & general construction. Married, Mid-West or West preferred. PW-7900, Engineering News-Record.

Sanitary Engineer, grad., registered, 39. 10 years experience all phases water and sewage systems and treatment. 5 years drainage, structural design, misc. Only consider permanent, responsible position in Midwest. PW-7885, Engineering News-Record.

Civil-Structural Engineer, reg. in several states, over 25 years of first class experience desires permanent position of responsibility in bridges and buildings. PW-7892, Engineering News-Record.

WHEN

Answering Advertisements

PLEASE *do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbon copies.*

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NEW "SEARCHLIGHT" ADVERTISEMENTS

received by October 10th will appear in the October 20th issue subject to limitations of space available. Address copy to the

Classified Advertising Division

ENGINEERING NEWS-RECORD

330 W. 42nd St., New York 36, N. Y.

Opportunity for

ARCHITECTURAL STRUCTURAL MECHANICAL and CHEMICAL ENGINEERS

with Record of Ingenuity and Originality in Research and Development of Quality Metal and Plastic Building Components.

Very large, progressive manufacturer in middle western city, who is establishing a new general research and development division, solicits applications for employment from persons qualified by training and experience for this work.

Send complete record of age, training, experience, employment and salary desired with first letter. All applications held strictly confidential and will be acknowledged promptly.

Write To:

P-7320, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Beautiful SUBURBAN CONNECTICUT . . .

ENGINEERS
and Dorr-Oliver of Stamford

Stamford, on the Connecticut shore is engineers' country. Famed for its fine homes and schools, modern shopping centers, and year-round recreational activities . . . yet it's only 46 minutes from the heart of New York City.

You can enjoy life in this residential community plus the advantages of working with Dorr-Oliver, an internationally known firm of process engineers, founded in 1904. Dorr-Oliver, has an excellent staff, an up-to-date plant. Salaries and benefits (Including group insurance, pensions and bonus plans) are exceptionally generous.

Positions are now open for:

SANITARY ENGINEERS To work with consultants advising on the types and sizes of equipment used for treatment of water, industrial wastes and sewage.

CHEMICAL ENGINEERS Interested in processing methods and equipment either in development or sales engineering.

Please send complete resume, in confidence to:

DORR-OLIVER Incorporated
BARRY PLACE STAMFORD, CONN.

HIGHWAYS ENGINEERS

A rapidly expanding organization devoted exclusively to highway engineering has openings at all levels for men experienced in the design of highways, freeways, expressways and associated work.

Work is in air-conditioned St. Louis office on long-term projects, with ample opportunity for professional development and advancement.

Assistance with moving expenses, excellent employee benefit and retirement plan, Blue Cross, paid vacations and holidays and sick leave.

Please send complete experience record, references, date available and salary desired in first letter.

SVERDRUP & PARCEL ENGINEERING COMPANY
1134 Locust St. St. Louis 1, Mo.

WANTED

Experienced Superintendent

In heavy earth and rock excavation using modern type equipment. Send resume of experience and references.

P-7663, Engineering News-Record
330 West 42nd Street, New York 36, N. Y.

MAKE A HABIT OF READING
EMPLOYMENT OPPORTUNITIES

ENGINEERS
HIGHWAYS AND BRIDGES

Designers
Draftsmen
Office Engineers
Maintenance Engineers
Project Engineers
Location Engineers
Soils & Materials Engineers

FIELD SURVEY PERSONNEL

Party Chiefs
Instrumentman
Chainmen

OTHER PERSONNEL

Hydrologist
Equipment Supervisor
Master Mechanic

Domestic and Overseas Assignments
Knowledge of Foreign language necessary in some classifications.

Write giving full particulars concerning education, experience, personal history and availability to:

Richard L. Shaw
Personnel Director
Michael Baker, Jr., Inc.
Consulting Engineers
Baker Building Rochester, Penna.

HEATING & VENTILATING ENGINEER

Graduate Engineer experienced in all phases of paper mill heating and ventilating air conditioning and refrigeration for large expanding and progressive mill in Maryland. Under 35 years of age, good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

ENGINEERS and DRAFTSMEN

Growing company expanding engineering division. Opportunities for rapid advancement into management and development work on TV broadcast antenna towers, industrial buildings, aircraft hangars, mechanical parking garages. Liberal benefits, including retirement. Moving expenses paid.

Write
Freeman Mann
DRESSER-IDECO COMPANY
One of the Dresser Industries
875 Michigan Ave.,
Columbus, Ohio

EXPERIENCED HYDRAULICS ENGINEER WANTED

Graduate engineer experienced in paper mill hydraulics, planning and development of piping layout systems, etc. for large expanding and progressive mill in Maryland. Good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland

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PROPOSALS $1.80 a line an insertion.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $20.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured 7/8 inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y., 36, N. Y. for October 20th issue closing October 10th

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REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITIES

For Sale—Well established surveying practice enjoying reputation for quality work in growing Florida community of sound economy. Excellent opportunity for single owner to net $7000.00 per year on an investment of less than $10,000.00. BO-7749, Engineering News-Record.

Desire to contact utility contractor, preliminary to bidding large housing project in mid-south location. Water lines, gas lines, storm and sanitary sewers, approximately half million dollar sub-contract. BO-7828, Engineering News-Record.

Prestressed Concrete—Plant for production of structural members for bridges and buildings requires capital for expansion. Growth potential virtually limitless. BO-7848, Engineering News-Record.

WANTED

ANYTHING within reason that is wanted in the field served by Engineering News-Record can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

Engineers—Foremen—Office Men

Learn latest methods to organize and run work. Prepare for the top jobs.

Send post card for details.

GEO. E. DEATHERAGE & SON
CONSTRUCTION CONSULTANTS
P.O. Box 921 Lake Worth, Florida

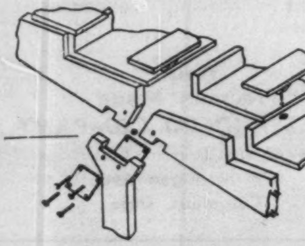
STRUCTURAL ENGINEERING
ARCHITECTURAL ENGINEERING

OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-third year.

[illegible] obligation

WILSON *Engineering Corp*
College House Offices HARVARD SQ. CAMBRIDGE MASS

Good Business for Concrete Contractors



Highly profitable franchises available for sales and construction of patented low cost pre-cast concrete grandstands on a royalty basis. Necessitates companies capable of handling large volume contracts and having experience in sales promotion work. Send for brochure.

Castadia, Inc.
2242 N. 35th St. Milwaukee 8, Wis.

WANTED

NEW or GUARANTEED USED:

Four 250 HP Electric Motors, 1800 RPM, 3-phase, 60-cycle, 440 volts, part winding increment start.

Four 200 HP Electric Motors, 1800 RPM, 3-phase, 60-cycle, 440 volts, part winding increment start.

Four 250 HP, 3-phase, 60-cycle, 440 volt part winding increment starters with disconnect and start-stop buttons in cover.

Four 200 HP, 3-phase, 60-cycle, 440 volt part winding increment starters with disconnect and start-stop buttons in cover.

W-7686, Engineering News-Record
1111 Wilshire Blvd., Los Angeles, Calif.

WANTED TO BUY

Used 2½ yd. SHOVEL

Northwest, Bucyrus Erie or Lorraine
also
Shovel attachment for Northwest

WILLIAMS CONSTRUCTION COMPANY
Box 145, Baltimore 20, Md.
Murdock 6-6600

Wanted

SUPERINTENDENTS and CONSTRUCTION FIELD ENGINEERS

Familiar with foundation and heavy construction. Reply—giving full particulars as to age, experience and salary to: E. C. Mardorf

INTRUSION-PREPAKT, Inc.
779-E Union Commerce Bldg. Cleveland 14, Ohio

WANTED

TWO or THREE DRUM HOISTS for our Rental Department

75 HP, 100 HP or 125 HP, gasoline or electric. Must be late models. State full details, make, age, type of power, and lowest cash price.

EQUIPMENT CORPORATION of AMERICA
P. O. Box J-608 Clifton Heights, Pa.

GREENHEART

"NAUTILUS" launched on Greenheart ways — Strongest of all structural timbers

GREENHEART (Demerara) Inc.
52 Vanderbilt Ave. New York. *MU-6-0410*

FOR SALE

American Steel Stiff Leg Derrick
4 to 6 ton capacity - 70' Boom

American Two Drum Hoist with Swinger
66 H.P. Gas Engine

WOERMANN CONSTRUCTION COMPANY
3800 W. Pine Blvd. St. Louis, Mo.

$2.95 Each or 2 for $5.00!

Genuine Telephone Company Upright Telephones, complete with cords, in tested and guaranteed condition with 50 ft. of wire, intercommunication instructions. Complete line of telephones and parts, dial, magneto, extension, intercommunication, army surplus communication equipment, etc. Write for free list. All shipments F.O.B. Simpson, Pa.

TELEPHONE ENGINEERING CO.
Dept. 10Y55 Simpson, Pa.

Excess Contractors Equipment

Subject to prior sale

Crawler Crane—Lima 604, 85 ft. boom, practically new, 1953.
Truck Crane—Lorain TL 20, 40 ft. boom
Compressor — Diesel, Gardner-Denver 500 c.f.
2 Compressors—gas, Ingersoll Rand 315 c.f.
Bulldozer—TD 18 International

National Structures Corp.
4-34 26 Avenue, Long Island City 2, N. Y.
RAvenswood 8-6270

Lorain 820 CRANE OR DRAGLINE

S/N 17646 Cat. 13000 Price $18,500

Wanted—Hyster Towing Winches—All sizes.

A. C. R. CO.
19615 Nottingham Rd., Cleveland 10, Ohio

FOR SALE

One—25 Ton Steel Erectors
Guy Derrick—114' Mast—105' Boom

Price $2500

ABERTHAW COMPANY
133 Southampton St., Boston, Mass.
Tel. Highlands 5-6700

Completely rebuilt and guaranteed
KOEHRING TWINBATCH 34E PAVER

Serial #19376, GM diesel, over $4,000.00 in parts and labor used in rebuilding. Machine in perfect condition. Ready for immediate inspection and delivery.
Price $13,000 f.o.b. Chicago.

GIL BOERS EQUIPMENT CO.
7625 S. Kedzie Ave., Chicago 29, Ill.

FOR SALE

1—3½ yd. Bucyrus-Erie Walker type Dragline, 95' boom, bucket included, electric swings.

Location: Ware, Illinois

H. F. HARDWICK COMPANY
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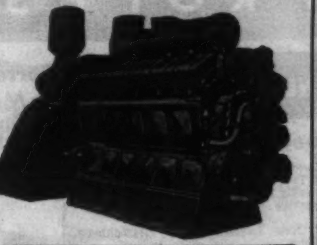

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EDITORIALS

When the President Returns

THE REACTION OF THE NATION to the news of President Eisenhower's illness was a great personal tribute—in the universal affection shown for his person and in the confidence displayed in his leadership, both by the first frightened selling on the stock market, and then by the quick turnabout in sentiment as reason replaced fear. For there is a soundness to the economy and a stability in the government to resist shock that has stemmed from this leadership, and that is a great national asset.

To the thankfulness that goes with the optimistic news on the President's recovery can thus be added thanks for the healthly state of the nation.

Supporting evidence of this health, in so far as construction is concerned, came out of the Associated General Contractors meeting last week where members reported business ahead of last year and "an increasing amount of work coming on the market." This accords with ENR figures that show contract awards for all classes of heavy construction running 31% ahead of last year. And it reflects the situation that led the Commerce and Labor Departments to estimate two weeks ago that construction put in place this year will reach a new high of $43 billion, and that $45 billion is probable for 1956.

When, therefore, the President recovers his health and is back on the job there is every reason for him to find a nation still under a full work load and with its vision of a bright future still unimpaired.

Flood Control on the Delaware

A UNANIMOUS APPEAL to the federal government for help in development of the Delaware River has been voiced by the state administrations of New York, New Jersey and Pennsylvania. This desire for federal government resources—leadership and financial aid—was stressed before the House Government Operations Committee at its recent hearings at Mount Pocono, Pa.

The two-day session of this subcommittee began a series of hearings it will hold on Hoover Commission recommendations. Held as it was in the wake of the Northeast's disastrous August deluge, the session heard much of Delaware River flood control, and at least the subcommittee's chairman, Representative Robert E. Jones of Alabama, went off convinced that "the Hoover Commission does not have the answer to the problem of the Delaware River Basin."

Such a statement is far too dogmatic, just as was the statement of a New Jersey delegate to the hearing who labeled the Interstate Commission on the Delaware River Basin a "failure".

Actually, the Hoover report, calling for minimum reliance on federal assistance, may well have the correct answer for full Delaware River development. And Incodel—the pollution control agency which in 1950 came up with an intelligent plan for full development of water supply on the river—is a "failure" perhaps only in its inability to gain four-state approval.

Until now, flood control in the Delaware Basin has been considered primarily a problem on the tributaries. For example, there have been two reservoirs proposed by the Corps of Engineers for the Lackawaxwen and one proposed for the Lehigh, both tributary rivers in Pennsylvania. Nevertheless the recent claim that a main-river water supply dam, proposed (among other things) in the Incodel Plan, might have been helpful in cutting the damage of the August flood suggests that this possibility of control should be examined.

In any event a flood on an interstate stream should not be cause for crying "help" to the federal government; for labeling sincere interstate efforts as failure; or for relinquishing local control of local problems. On the contrary, the disastrous August flood might indicate desirability of a small amount of federal participation in an Incodel Plan revised as necessary to insure flood control. Such revision, justifying federal participation in costs directly related to flood control, could possibly gain acceptance for the proposed basin-wide development previously deemed unacceptable by Pennsylvania.

A limited amount of federal financial assistance might be just the catalyst for much needed complete development of the Delaware. But it should not be sought in exchange for local leadership and control in development of a great river so primarily a local asset and so secondarily a national problem.

Highway Finance Plans Needed

THE WESTERN ASSOCIATION of State Highway Officials is to be congratulated for having approved a definite plan for financing the badly needed national highway program (ENR Sept. 15, p. 24). More of that type of definite action on the part of other highway groups should be a help in shaping up highway legislation when Congress reassembles.

The WASHO plan is a compromise between one based solely on motor-vehicle taxes and one based on current taxes plus bond issues. It may not be what all members of that association favor, and it may be quite different from what Congress finally adopts. But it has the advantage of being something definite to discuss. What would also be helpful would be for the oil companies and the trucking associations, which opposed the legislation under consideration at the last session of Congress, to submit financing plans that would be satisfactory to them. In that way, the thinking of the opposing groups would be put on the record early for analysis and discussion.

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When Atlanta used steel traffic signs, vandalism and weather cut life expectancy to as little as three years. Since the city's switch to Alcoa Aluminum, Assistant Traffic Engineer, Lamar Thomas, rates sign life at seven years and says it may go higher.

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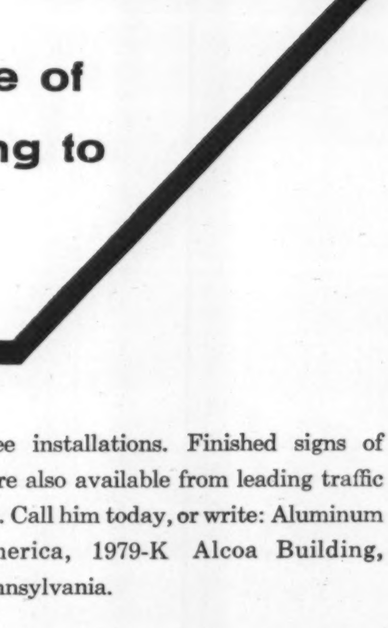

Concrete mixer drum turns smoothly on TIMKEN® bearings despite cement dust, sand and water

THE drum of this portable Jaeger 16-S Speedline mixer turns smoothly because Timken® tapered roller bearings on the drum shaft *roll* the load instead of slide it. As a result, the mixer runs smoother, lasts longer, requires less maintenance.

And although this 16-S Speedline mixer holds up to 2400 pounds of mix, none of the cement dust, sand and water it works in can get into the bearings. Reason: Timken tapered roller bearings hold shafts and housings concentric, making closures more effective. Lubricant stays *in,* dirt and water stay *out.*

There's no end-play in the drum shaft because Timken bearings are tapered—take *both* radial and thrust loads. They're also used in the wheel hubs of axle assemblies manufactured by the United Manufacturing Co.

When the mixer is jouncing over rough terrain behind a truck, the Timken bearings take the shock loads with ease. Rollers and races are case-carburized to give them a tough, shock-resistant core under a hard, wear-resistant surface.

To get steel good enough for Timken bearings, we have to make our own. We're the only bearing maker in the U. S. who does. It's another reason to always specify Timken bearings for longer life, less friction, minimum maintenance. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

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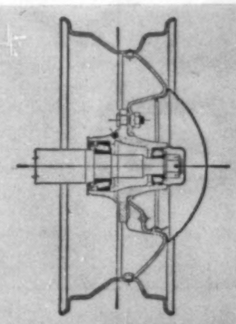
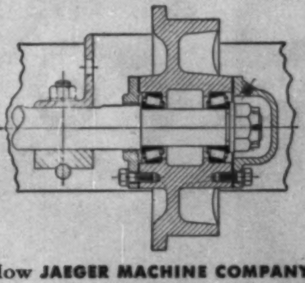
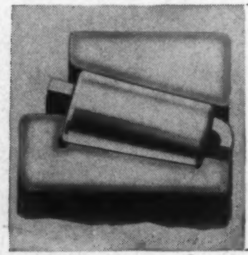


How the **UNITED MANUFACTURING COMPANY** mounts the wheel hubs on axle assemblies using Timken tapered roller bearings to take the heavy shock loads.



How **JAEGER MACHINE COMPANY** mounts the drum roller shaft of its 16-S Speedline Mixer on Timken tapered roller bearings for longer life, less maintenance.



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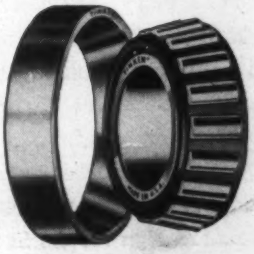

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